TOWN OF BROOKLINE

Department of Public Works
333 Washington Street
Brookline, MA 02445-6863

NOTICE TO CONTRACTORS

SPECIFICATIONS

PROPOSAL and CONTRACT AGREEMENT

For

Washington Street /Emerald Necklace Pedestrian & Bicycle Improvements

CONTRACT No. PW/15-20 Re bid

This Proposal To Be Opened And Read:
Monday, January 25, 2016 @ 1:00 PM Local Time

Name of Contractor : _____

SPECIAL NOTICE

PRE-BID MEETING Thursday January 7, 2016 @ 10 AM
Location: Brookline Town Hall room 111

The following pages shall be filled out completely at the time of bidding:

Proposal Page P - 1 thru P - 22

Bid security in the amount of 5% of Bid in a sealed envelope shall be attached to the outside of Bid Book envelope.

THIS CONTRACT SHALL BE SUBMITTED INTACT

Contract No. PW/15-20 Re Bid
CONTRACT NAME :Washington Street / Emerald Necklace Pedestrian & Bicycle Improvements

BID DUE: Monday January 25, 2016 @ 1:00 p.m. Local Time

The following pages shall be filled out completely subsequent to the time of contract award:

Contractor's Certification Page SC - 16

Contract Page C-2 thru C-5

At contract completion:

Statement of Compliance Page SC-16 thru SC-17

INDEX

Washington Street / Emerald Necklace
Pedestrian & Bicycle Improvements

CONTRACT NUMBER PW/15-20 Re-Bid

SPECIAL PROVISIONS

The 1988 edition of "STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND WATERWAYS" of the Commonwealth of Massachusetts, Department of Public Works including supplementary specifications, amendments and addenda thereto are incorporated by reference in this Proposal and Contract and are referred to as the "STANDARD SPECIFICATIONS".

The "STANDARD SPECIFICATIONS" are revised by the following special provisions to conform with practices of the Town of Brookline. In case of conflict between these Special Provisions and the aforesaid "STANDARD SPECIFICATIONS", these Special Provisions shall take precedence and shall govern.

The enforcement of the requirements of any of the following Special Provisions shall not be constructed as waiving any of the rights of the Party of the First Part contained in any of the other divisions of the contract.

This contract shall be interpreted in accordance with the laws of the Commonwealth of Massachusetts. All actions, claims and disputes hereunder shall be presented to a court or agency of the Commonwealth of Massachusetts.

SECTION 1.00

DEFINITION OF TERMS

1.01 Definition of Terms (page 3)

The following words, terms, or their pronouns used in the "STANDARD SPECIFICATIONS" shall be understood to mean as follows:

Chief Engineer	The Commissioner of Public Works, Town of Brookline
Commissioner, Commissioners and Board of Commissioners	The Board of Selectmen, Brookline, Massachusetts
Commonwealth	The Town of Brookline
Department	The Town of Brookline Department of Public Works
Department Secretary	Administrative Assistant, Town of Brookline, Department of Public Works

Engineer, Resident Engineer,
Research and Materials Engineer ..... The Commissioner of Public Works, Town of Brookline, acting directly or through an authorized representative acting within the scope of the particular duties entrusted to him.

Notice to Contractors..... The notice published in newspapers or publicly posted within the Town of Brookline announcing the time and place for the opening of bids for work to be done.

Party of the First Part..... The Town of Brookline acting through its duly authorized officials.

Right of Way..... That area which has been laid out or acquired for municipal purposes.

Special Provisions..... The special directions, provisions and requirements prepared to cover proposed work not satisfactorily provided for by the "STANDARD SPECIFICATIONS". These special provisions shall be included within the general term "STANDARD SPECIFICATIONS" and shall be made a part of the contract with the express purpose that they shall prevail over all other specifications.

Specifications..... The directions, provisions and requirements contained herein and contained in the aforesaid "STANDARD SPECIFICATIONS", together with all written agreements made or to be made pertaining to the method and manner of performing the work of the quantities and qualities of materials to be furnished under the contract.

Supervisor of Fiscal Management ..... Administrative Assistant, Town of Brookline, Department of Public Works.

SECTION 2.00

PROPOSAL REQUIREMENTS AND CONDITIONS

2.01 Proposal Forms and Plans (page 7)

B. Issuance of Proposal Forms and Plans
Revise as follows:

First paragraph - Delete lines 7, 8 and 9 and Add:

that "Approval for Proposal Form" to the Engineering Division, Department of Public Works, 4th Floor, 333 Washington Street, Brookline, Massachusetts, accompanied by cash, bank check, certified check or money order in the amount stated in the "Notice to Contractors" made payable to the Town of Brookline.

2.05 Delivery of Proposals (page 9)

Revise as follows:

Each proposal shall be submitted to the Administrative Assistant of the Department of Public Works, Town of Brookline, sealed in an envelope on which is clearly indicated the contents, including the name of the municipality in which the improvement is to be made, and the name and address of the Bidder.

If forwarded by mail, preferably by registered mail, the above mentioned envelope shall be enclosed in another envelope which shall be addressed to the Administrative Assistant, Town of Brookline, Department of Public Works, Brookline, Massachusetts. Proposals received at the office of the Administrative Assistant after the time for opening of bids designated in the Notice to Contractors will be returned to the bidder unopened.

2.07 Withdrawal of Proposals (page 9)

Revise as follows:

A bidder may withdraw his proposal provided the request in writing is in the hands of the Administrative Assistant of the Department of Public Works, Town of Brookline, by the time set for opening proposals. When such proposal is reached during the opening of the bids it will be returned to the bidder unopened.

2.11 Competency of Bidders (page 10)

Revise as follows:

No contract will be awarded except to responsible bidders capable of performing the class of work contemplated. Before the award of the contract, any bidder may be required to show that he has the necessary facilities, experience, ability and financial resources to perform the work in a satisfactory manner and within the time stipulated. If the contract contains special work of a complicated nature or if it contains items for materials or work experience, he will be required to show proof that he has a satisfactory record of similar work performed or materials furnished under other contracts. A bidder who fails to comply with this requirement will not be considered for award of contract.

SECTION 3.00

AWARD AND EXECUTION OF CONTRACT

3.05 Execution of Contract (page 11)

Revise as follows:

The prepared contract and bond forms will be sent with the notification of award to the successful bidder who shall execute and deliver the contract and furnish the surety, in conformity with the stipulations contained in Subsection 3.04, and Subsection 7.05 in the amounts named in the Special Provisions, to the Department within seven (7) calendar days after the date of the award.

The contract shall be in writing and be executed in quadruplicate; one of which shall be retained by the Brookline Selectmen, one retained by the Department, and one each delivered to the Comptroller of the Town of Brookline and the contractor.

SECTION 5.00

CONTROL OF WORK

5.06 Adjacent Contracts (page 17)

Add the following paragraph:

The Contractor's attention is directed to the fact that work by utility companies, municipal departments and other contractors will be carried on concurrently within and adjacent to the limits of the contract. The said companies, departments and other contractors will require access over the site and the Contractor shall do his work in cooperation with them, in accordance with the stipulations of Subsection 5.06. The attention of the Contractor is also directed to the provisions of General Laws, Chapter 82, Section 40 as amended, no one may excavate in the Commonwealth of Massachusetts except in an emergency without giving 72 hours notice, exclusive of Saturdays, Sundays, and legal holiday's to natural gas pipeline companies, public utility companies, cable television companies, and

municipal utility departments that supply gas, electricity, telephone or cable television service in or to the city or town where the excavation is to be made.

The utility companies have established a public utility underground plant damage prevention system called "Dig Safe" to receive the above mentioned notices of excavation which are then transmitted to member utilities. There is no cost to the excavator. The calls are received over toll free lines (phone number: 1-888-DIG-SAFE or 1-888-322-4844).

THIS NOTIFICATION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

5.07 Construction (Stakes) Staking (page 18)

Revise as follows:

The Department will furnish base lines, benchmarks and measurements used for payment. The Contractor shall furnish all other engineering work and approved materials required for strict compliance with lines and grades shown on the plans and he shall employ qualified engineering personnel for the purpose.

The Department may check the engineering work of the Contractor as the work progresses and will inform the Contractor of the results of the check. Such notice does not relieve the Contractor of his responsibility for the accuracy of the engineering work.

5.11 Final Acceptance (page 19)

Revise as follows:

Before any acceptance of the entire project the Engineer will make a complete final inspection of the work done.

If the work or any part thereof is not acceptable to the Engineer at the time of the final inspection, he shall notify the Contractor in writing of the particular defects or parts to be remedied before final acceptance. If the contractor has not arranged, within a period of five (5) days after the date of transmittal of such notice of unacceptance, to complete the work as speedily as described by the Engineer, the Engineer may without further notice and without in any way affecting the contract, make such other arrangements as he may consider necessary to insure the satisfactory completion of the project. The cost of so completing the work shall be deducted from any moneys due or which may become due the Contractor under the contract.

SECTION 6.00

CONTROL OF MATERIALS

6.01 Source of Supply and Quality (page 20)

Add the following paragraph:

Trade names and catalog numbers mentioned on the Plans or in the Special Provisions are used for the purpose of furnishing a brief description of the materials. Similar materials will be accepted if, in the opinion of the Engineer, they are equal in quality and operation to those specifically mentioned. All materials must have the name or trademark of the manufacturer stamped thereon when and where such identification of materials is customary.

SECTION 7.00

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

7.05 Insurance Requirements (page 25)

The minimum limits of the several kinds of liability insurance required for this contract are listed as follows:

Public liability.....$1,000,000 / 2,000,000
Contractor's Protective Liability .....$1,000,000 / 2,000,000
Property Damage .....$1,000,000 / 2,000,000
Contractor's Protective Property Damage.....$1,000,000 / 2,000,000

The Town shall be named "**additional insured**" along with being named as owner and certificates of insurance shall be furnished to both parties. The Contractor shall do reporting of accidents and claims. These policies must contain on their face a notation that they cannot be canceled without at least thirty-(30) day's notice in writing to the Town as owner.

Attention is directed to Section C of said Subsection 7.05 wherein it stipulates that the above insurance shall cover all damages to property whether above or below ground and other pertinent requirements.

7.09 Public Safety and Convenience (page 27)

Add the following paragraph:

Reasonably safe and convenient facilities shall be provided by the Contractor for the passage of pedestrians, vehicles and public emergency vehicles through the site of the improvement and to and from land abutting thereon. When the construction work interferes with the use of parking meters, the

Contractor shall notify the Chief of Police of the Town of Brookline prior to beginning any work so affecting the parking meters.

7.11 Traffic Officers and Railroad Flagging Service (page 28)

Revise as follows:

The Contractor shall provide for such regular police officers as the Engineer deems necessary for the direction and control of traffic within the site of the improvement. Application shall be made to the Brookline Police Department for these personnel. Such police officers shall be regular Town police officers and shall wear regulation policemen's uniforms. Upon receipt of a bill for the services of regular police officers, based upon a regular patrolman's rate of pay, the Contractor shall submit the said bill to the Engineer for payment by the Town.

When any of the work operations, required to be done by the Contractor, obstructs the tracks of a railroad or street railway, or in any way endangers the operations of a railroad or railway and the Chief Engineer or other railroad or railway official deems the employment of a flagman or flagmen necessary (Subsection 7.09, Public Safety and Convenience), the Contractor shall apply to the railroad or street railway for this personnel. Upon receipt of a bill for the services of the flagman or flagmen, based upon a regular flagman's rate of pay, the Contractor shall submit the said bill to the Engineer for payment by the Town.

7.13 Protection and Restoration of Property (page 29)

Add the following paragraph:

Whenever it is necessary to interfere with the aforesaid underground structures, the Contractor shall maintain their respective services, and, if necessary for that purpose, shall cause temporary services to be laid. He shall repair all damage done to underground structures and shall leave them in as good condition as they were previous to the beginning of the work. If so directed by the Engineer, permanent changes of locations of said underground structures, not indicated on the plans or in the "STANDARD SPECIFICATIONS", shall be made by the Contractor to meet the requirements of the new construction and its appurtenances and new work shall be added, when necessary, to leave said underground structures in good working order. The cost of such permanent changes not indicated on the plans or in the "STANDARD SPECIFICATIONS" is to be paid for as Extra Work when so ordered in writing by the Engineer.

Whenever it becomes necessary to move or relocate any Postal Collection or Relay Boxes the Contractor shall notify the Postmaster, Boston, Massachusetts at least Forty-eight (48) hours before operations are carried on in the area, at which time the Postal authorities will make arrangements for the proper removal.

7.14 Responsibility for Damage Claims (page 29)

Revise first paragraph as follows:

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Town of Brookline, its officers, agents, servants, and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the work covered by the contract or failure to comply with the terms and conditions of said contract, provided that such claims, damages, loss or expenses is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage loss or expense is caused in part by a party indemnified hereunder.

Revise third paragraph as follows:

The Selectmen may delay the beginning of the work or any part thereof if they shall not have obtained possession of the land in or upon which the same is to be performed, or if for any reason it becomes necessary to do so. The Contractor shall have no claim for damages on account of such delay, but shall be entitled to so much additional time wherein to perform and complete this contract on his part as the Engineer shall certify in writing to be just. Wherever any part of the work covered by this agreement is done in part by or connects with the work of other contracts, the Contractor agrees to perform his work so as to accommodate the work of the other contractors, and to cooperate with such contractors in mutual agreements as to all such work, and no contractor shall have any claim against the Town growing out of the negligence or delay of any other contractor or contractors; but each contractor shall be liable to every other contractor for any such delay or negligence.

7.16 Claims of Contractor for Compensation (page 34)

Revise as follows:

No person or corporation, other than the signer of the contract as Contractor, now has any interest hereunder, and no claim shall be made or be valid; and neither the Party of the First Part nor any member, agent or employee thereof, shall be liable for, or be held to pay, any money except as provided in Subsections 4.02, 4.03, 4.04, 4.06, 8.12, and 9.02 and Clause 3 of the Contract.

All claims of the Contractor for compensation other than as provided for in the contract on account of any act of omission or commission by the Party of the First Part or its agents must be made in writing to the Engineer within one week after the beginning of any work or the sustaining of any damage on account of such act, such written statement to contain a description of the nature of the work performed or damage sustained; and the Contractor shall, on or before the fifteenth (15) day of the month succeeding that in which such work is performed or damage sustained, file with the Engineer an itemized statement of the details and amount of such work or damage. Unless such statement shall be made as so required, the Contractor's claim for compensation shall be forfeited and invalid, and he shall

not be entitled to payment on account of any such work or damage. The determination of the Engineer shall be final upon all questions as to the amount and value of such work, and the fact and extent of such damage.

The acceptance by the Contractor of the last payment made under the provisions of Subsection 9.05 shall operate as and shall be a release to the Party of the First Part and every member, agent and employee thereof, from all claims and liability to the Contractor for anything done or furnished for, or relating to, the work, or for any act or neglect to the Party of the First Part or any person relating to or affecting the work, except the claim against the Party of the First Part for the remainder, if any there be, of the amount kept or retained as provided in Subsection 7.15.

7.22 Labor, Lodging, Board, Maximum Hours of Employment, Weekly Payment, Keeping of Payroll Records. (page 37)

Revise second paragraph as follows:

No laborer, workman, mechanic, foreman and inspector employed by any contractor or subcontractor, or other person, doing or contracting to do the whole or a part of the work contemplated by this contract shall be required or permitted to work more than eight (8) hours in any one day or more than forty-eight (48) hours in any one week, or more than six (6) days in any one week, except in cases of emergency (General Laws, Chapter 149, Section 30).

Subject to the provisions of Subsection 8.03 (Prosecution of Work) no work shall be performed under this contract on a Saturday, Sunday or a legal holiday or on any other day before 7:00 A.M. or after 4:00 P.M., except:

1. In case of emergency, the determination of which shall be made solely by the Engineer; or,

2. On written request by the Contractor and written approval by the Engineer. The Contractor shall be responsible for securing the approval of all bodies or tribunals having jurisdiction or authority relevant to work during restricted hours. The Contractor's written request shall contain a statement that the Contractor agrees to reimburse the Town for wage payments made to the Engineer's representative for overtime employment at normal and/or overtime rates.

Where applicable, the Town shall be reimbursed for wage payments made for such overtime work by deducting such wage payments from periodic pay estimates due to the Contractor under Subsection 9.04.

The written approval of the Engineer permitting work during the restricted hours and days shall not be construed as relieving the Contractor from any responsibility as set forth in Subsection 8.03 or any other provisions in the "STANDARD SPECIFICATIONS".

SECTION 8.00

PROSECUTION AND PROGRESS

8.04 Removal or Demolition of Buildings and Land Takings (page 39)

Delete the word "highway" in the first line.

8.11 Failure to Complete Work on Time (page 42)

Schedule of deductions :

Original Contract Amount		Daily Charge
From More Than	To and Including	Per Calendar Day
0	100,000	$250.00
100,000	500,000	$375.00
500,000	1,000,000	$425.00
1,000,000	2,000,000	$550.00
2,000,000	3,000,000	$675.00
3,000,000	4,000,000	$800.00
4,000,000	5,000,000	$925.00
5,000,000	10,000,000	$1050.00
10,000,000	15,000,000	$1175.00
	Over 15,000.000	$1500.00

SECTION 9.0

MEASUREMENT AND PAYMENT

Subsection 9.04 Partial Payments (page 47)

Revise second paragraph as follows:

There will be a retainage of Ten (10%) percent of the value of all planting items. For all other items of work, there will be a retainage of Five (5%) percent for the first Fifty (50%) percent of the Contract Price excluding planting items.

Add the following paragraph:

The Contractor shall be responsible for the reimbursement to the Town for all wages, computed at standard and/or overtime rate, paid to the Engineer or his authorized agent for employment outside of regular Town working hours for overtime work requested by the Contractor. Such reimbursement shall be made by deducting the various sums, paid by the Town to its employees, from periodic partial pay estimates due the Contractor.

SPECIAL CONDITIONS

Required Compliance with Chapter 151B

During the performance of this Contract, the Contractor, for himself, his assignees and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

(1) Compliance with Requirements:

The Contractor will comply with the provisions of Chapter 151B as amended of the non-discrimination Laws of the Commonwealth, which are herein incorporated by reference and made a part of this Contract insofar as applicable to this Contract.

(2) Non-discrimination:

In the performance of work under this Contact, the Contractor shall not discriminate in employment practices or in the selection or retention of sub-contractors or in the procurement of materials or rental of equipment, on the grounds of race, color, religion, national origin, age or sex.

The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representative of the Contractor's commitments under this section, and shall post copies of such notice in conspicuous places available to employees and applicants for employment.

(3) Solicitations for Subcontracts and in the Procurement of Materials and Equipment:

In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract and for the procurement of materials or equipment, each potential sub-contractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this Contract relative to non-discrimination on the grounds of race, color, religion, national origin, age or sex.

(4) Information and Reports:

The Contractor will provide all information and reports required, on orders or instructions issued by the Department of Public Works or the Massachusetts Commission Against Discrimination, and will permit access to his books, records, accounts and other sources of information and facilities as may be determined pertinent by the Massachusetts Commission Against Discrimination to ascertain compliance with such orders or instructions. Where the information required is in the exclusive possession of another who fails or refuses to furnish the required information, the Contractor shall so certify to the Department of Public Works or the Massachusetts Commission against Discrimination, as appropriate, and shall set forth what efforts he has made to obtain the required information.

(5) Sanctions for Non-Compliance:

In the event the Contractor fails to comply with the non-discrimination provisions of this Contract, the Department of Public Works shall impose such contract sanctions as it may determine to be appropriate, including but not limited to:

(a) withholding of payments due the Contractor under this contract until the Contractor complies, and/or
(b) cancellation, termination or suspension of this Contract, in whole or in part.

The Contractor's right of appeal is assured under Section 6 of Chapter 151B of the General Laws of the Commonwealth.

(6) Incorporation of Provisions:

The Contractor shall include the provisions of paragraph (1) through (6) in every subcontract, including the procurement of materials and rentals of equipment. The Contractor shall take such action with respect to subcontracts or procurements as the Department of Public Works may direct as a means of enforcing such provisions, including sanctions for non-compliance, provided however, that in the event the Contractor becomes involved in, or is threatened with litigation with a subcontractor or supplier or union or association as a result of such direction, the Contractor may request the Town of Brookline to enter into such litigation to protect the interests of the Town of Brookline.

TOWN OF BROOKLINE, MASSACHUSETTS

AFFIRMATIVE ACTION PROGRAM FOR CONTRACTORS AND VENDORS

FOR BIDS OF $10,000 OR OVER

I. PURPOSE

The purpose of the program is to guarantee that contractors*, wishing to do business with the Town of Brookline, do not discriminate against persons for whom their race, religion, color, sex, national origin, or age have proven to be obstacles to their employment (new or continued) or advancement.

All successful contractors receiving Town contracts for $l0,000 or more must include written documentation of compliance with its Town's Affirmative Action Program for contractors as stated in Article 4.4 of the Town's By-Laws (attached.) Such documentation shall be in compliance with the following Affirmative Action statement.

> "In connection with the execution of this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, or age. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during their employment, without regard to their race, religion, color, sex, national origin, or age. Such action shall include, but not be limited to, the following:
>
> > employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay, or other forms of compensation; and selection for training, including apprenticeship."

* This includes vendors throughout.

II. COMPLIANCE

The Affirmative Action Program must include evidence of the following:

l. Unless Union agreements prohibit and there is no union Affirmative Action Program acceptable to the Human Relations-Youth Resources Commission, or there is no union, the Contractor must use varied sources of new employees. These sources would include state and private employment services and agencies, minority group organizations such as the Urban League, the National Association for the Advancement of Colored People (NAACP), and other ethnic associations, Action for Boston Community Development, Neighborhood Employment Centers, youth groups, special neighborhood groups, Spanish, Chinese, and other minority language sources (Note - the Brookline Human Relations- Youth Resources Commission maintains an Affirmative Action List which it will make available to any contractor upon receipt of written request). These sources (and others) and applicants from them should constitute the Contractor's Affirmative Action List.

2. Job applications shall be retained and maintained in an Affirmative Action File so that the number of minority persons interviewed who have applied to the Contractor for employment, shall be a matter of record. As job opportunities occur, these applications will be considered in filling the job.

3. All notices for job openings shall contain the phrase "An Affirmative Action Employer."

4. Where feasible, effective human relations components must be included in orientation instructions for all employees, in on-the-job training, in first-line supervisor and foreman training and continuing training (especially including reprimand and the possibility of harassment; Note - United States court decisions hold the employer responsible for such forms of discrimination.) Affirmative action in human relations should be included in all industrial and labor relations matters, including union contract discussion and negotiation.

III. DOCUMENTATION

l. All successful contractors shall file an Affirmative Action Plan with the Human Relations-Youth Resources Commission within fifteen (15) days after the execution of the contract prior to the first payment after the fifteen day period has expired if they have not received objection from the Human Relations-Youth Resources Commission.

2. Successful contractors receiving contracts for more than $50,000 shall be required to file in addition to their Affirmative Action Plan (No. l above) the following documentation:

a. Affirmative Action compliance reports that the contractor is required to file with the Area Office, U.S. Department of Housing & Urban Development.

b. A copy of the Contractor's notice to each labor union or representative of workers with which he deals, advising them of affirmative action agreement with the Town (Article 4.4, Section l c.)

c. A copy of the notice to each potential sub-contractor of supplies wherein is stated the Contractor's affirmative action program.

d. A copy of the Contractor's notice to all employees, especially managers, the personnel director and first-line supervisors communicating his intentions to abide by the Human Relations-Youth Resources Commission's Affirmative Action Statement.

e. Contractors filing EEO-1 Standard Form 100 with the United States Equal Employment Opportunity Commission, or Affirmative Action Compliance Reports under the Department of Labor, Office of Federal Contract Compliance Rules and Regulations Part 60-1. 40, under authority of Presidential Executive Order 11246 (amended l968) shall include copies of the most recent returns. Copies of the most recent plans under the Governor's Executive Order 74, filed

with the Massachusetts Commission Against Discrimination, should also be filed with the Human Relations-Youth Resources Commission.

3. Successful contractors receiving contracts between $10,000 and $50,000 may be required, if requested by the Human Relations-Youth Resources Commission, to submit some or all of the applicable documentation listed in paragraph number two above.

IV. PROCEDURE

The following procedure must be adhered to:

l. The successful contractor will be obliged to return the necessary documentation as previously outlined to the Human-Relations-Youth Resources Commission.

2. Technical assistance in the preparation and implementation of effective Affirmative Action Compliance Programs will be supplied by the Human Relations-Youth Resources Commission, or sources for such assistance recommended, upon request by the Contractor.

3. Giving of Reports: Required documents shall be in the Human Relations-Youth Resources Commission Office within fifteen (15) days after the execution of the contract and prior to the first payment, except when extended by the Human Relations-Youth Resources Commission.

V. REVIEW

The contractor will be subject to periodic review made by the Human Relations-Youth Resources Commission on the basis of these documents and other supplementary information, including field investigation and consultation with other government agencies.

TOWN OF BROOKLINE, MASSACHUSETTS

NOTICE TO BIDDERS AND CONTRACTORS

TOWN POLICY ON ARAB LEAGUE STATES BOYCOTT

AGAINST THE STATE OF ISRAEL

The Board of Selectmen unanimously voted the following Resolution on July 12, 1976:

WHEREAS, the Town of Brookline has established an Affirmative Action Program in accordance with the provisions of Article 4.4 of the Town By-Laws; and

WHEREAS, the Arab League States are enforcing a boycott against the sovereign State of Israel, an ally of the United States; and

WHEREAS, it is the stated policy of the United States of America to oppose economic sanctions used against our allies; and

WHEREAS, the Arab League States are enforcing a secondary boycott against American companies which are trading with or in Israel; and

WHEREAS, the Arab League States are enforcing a tertiary boycott which requires American companies to discriminate against other American companies; and

WHEREAS, certain Arab States require American companies to discriminate in employment against Jews, blacks and women; and

WHEREAS, these practices are contrary and violate the American democratic tradition, morality, and law and the policies of the Town of Brookline, and represent an imposition of foreign discriminatory practices on Americans;

NOW THEREFORE, it is hereby resolved as a matter of public policy that the Town of Brookline declares that it will not trade with any company or corporation which practices discrimination against persons because of their friendly relations with our ally, the State of Israel, and it is further hereby

RESOLVED, that the Purchasing Agent for the Town of Brookline be and the same hereby is requested to inform all contractors with the Town of this non-discriminatory policy and directed to enforce the above policy with respect to all goods, services and commodities purchased by the Town.

Excerpt from the Bylaws of the Town of Brookline

ARTICLE 4.4
FAIR EMPLOYMENT PRACTICES RELATIVE TO TOWN CONTRACTS

SECTION 4.4.1 CONTRACT PROVISIONS AND REQUIREMENTS

Subject to the exceptions hereinafter stated, all contracts awarded by the Town and all agencies and departments thereof, shall include the following provisions :

During the performance of this Contract, the Contractor, for himself, his assignees and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

(a) The Contractor will comply with the provisions of Chapter 151B, as amended, of the General Laws of Massachusetts relative to non-discrimination which are incorporated herein by reference and made a part of this Contract.

(b) In the performance of work under this Contract, the Contractor shall not discriminate in employment practices or in the selection or retention of sub-contractors or in the procurement of materials or rental of equipment on the grounds of race, color, religion, or national origin, or on the grounds of age or sex except when age or sex is a bona fide occupational qualification.

The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representative of the Contractor's commitments under this section, and shall post copies of such notice in conspicuous places available to employees and applicants for employment.

(c) In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract and for the procurement of materials or equipment, each potential sub-contractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this Contract relative to non-discrimination on grounds of race, color, religion, national origin, age or sex, and his obligations to pursue an affirmative course of action as required by paragraph (d).

(d) The Contractor will pursue an affirmative course of action as required by affirmative action guidelines adopted by the Human Relations Commission in effect on the effective date of the contract, or when calls for proposals are made, which ever is sooner, which are herein incorporated by reference, attached hereto, and made a part of this Contract, reasonably pertaining to the work force, to insure that applicants are sought and employed, and that employees are treated, during their employment, without regard to their race, color, national origin or ancestry, or religion. No changes in affirmative action guidelines hereinafter adopted by the Commission shall be effective with respect to contracts already in effect, without the express written consent of the Contractor.

(e) In the event the Contractor fails to comply with the foregoing non-discrimination provisions of this Contract, the contracting agency of the Town, upon advise and counsel of the Human Relations Commission, shall impose such contract sanctions as it may determine to be appropriate, including but not limited to :

(1) withholding of payment due the Contractor under this contract until the Contractor complies, and/or
(2) cancellation, termination or suspension of this Contract, in whole or in part.

For the purposes of this section the contracting agency of the Town shall accept as proof of non-compliance with the provisions of Section 4.4.1 (a), only final orders or decisions of the Massachusetts Commission Against Discrimination.

(f) The provisions of this section shall be deemed supplementary to, and not in lieu of, or in substitution for, the provision of Massachusetts Law relating to non-discrimination, and other applicable Federal, State or Town law, by-law, rule, regulation and directive relative thereto. In the event of a conflict between the provisions of this section and, where inserted or incorporated in this contract, an applicable state or federal law, rule, regulation or directive, the conflicting provisions of the latter shall control.

SECTION 4.4.2 EXEMPTIONS

The requirements of Section 4.4.1 shall not apply to the following contracts :

a) Whenever work is to be or has been performed outside the state and no recruitment of workers within the state is involved
b) Those involving standard commercial supplies or raw materials
c) When the Contractor is a club exclusively social, or a fraternal association or corporation, if such club, association or corporation is not organized for private profit.
d) When the Contractor employs fewer than six persons
e) When the total value of the contract is less than $10,000.00
f) Contracts involving joint purchases with the State
g) Contracts with the Commonwealth for construction of public works
h) Contracts for financial assistance with a government or governmental agency
i) Notes and bonds of the Town
j) Employment by the Town of officers and employees of the Town
k) Whenever it is deemed necessary or appropriate the Board of Selectmen, upon the advise and counsel of the Human Relations Commission, may exempt any contract not covered by the foregoing exemptions from the operation of this By-law in whole or in part.

SECTION 4.4.3 REQUESTS FOR PROPOSALS

All REQUESTS for proposals for contracts subject to the provisions of this Article shall include a statement notifying all bidders that the contract awarded pursuant to the proposal is subject to the provision of this Article of the By-laws, relating to non-discrimination in employment.

Excerpt from the Bylaws of the Town of Brookline

ARTICLE 4.5
DISCRIMINATION PROHIBITION WITH REGARD TO CONTRACTS

SECTION 4.5.1 UNLAWFUL PRACTICE

It shall be an unlawful practice for a person proposing to enter into a contract with the town, under general laws, chapter 30b, that exceeds $10,000.00, to discriminate against any individual because of the race, color, religious creed, national origin, sex, sexual orientation, which shall not include persons whose sexual orientation involves minor children as the sex object, age or ancestry of any individual.

SECTION 4.5.2 CERTIFICATION OF CONTRACTOR

Any person or employer proposing to contract with the town, as set forth in section 4.5.1, shall file with the contract documents a certification made under the pains and penalties of perjury that the person or employer does not discriminate against any individual, as set forth in section 4.5.1.

SECTION 4.5.3 AWARD OF CONTRACT

Unless otherwise required by law, no contract shall be executed until the certification required under section 4.5.2 has be filed with the awarding authority. The provisions of article 4.4 shall, when applicable, apply to this article 4.5.

TOWN OF BROOKLINE

SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

I For the purposes of this contract, "minority" refers to Asian-Americans, Blacks, Spanish Surnamed Americans, North American Indians, and Cape Verdeans. "Commission" refers to the Massachusetts Commission Against Discrimination. "Town" hereinafter refers to the Town of Brookline.

II During the performance of this contract, the Contractor and all of (his) Sub-contractors (hereinafter collectively referred to as the Contractor), for himself, his assignees, and successors in interest, agree as follows:

1. In connection with the performance of work under this contract, the contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age, or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection of apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Town setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (M.G.L. Chapter 151B).

2. In connection with the performance of work under this contract, the Contractor shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age, or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion, or transfer, recruitment, layoff or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal opportunity in employment for all persons, regardless of race, color, religious creed, national origin, age or sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Town public construction projects.

III 1. As part of his obligation of remedial action under the foregoing section, the Contractor shall maintain on this project a not less than 5% ratio of minority employee man hours to total man hours in each job category including but not limited to brick-layers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work" enumerated in Section 44C of Chapter 149 of the Massachusetts General Laws.

2. In the hiring of minority journeyman, apprentices, trainees, and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Town, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee of the Town.

IV 1. At the discretion of either the Commission or the Town there may be established for the life of this contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering this project, hereinafter called the administering agency, the Town and such other representatives as may be designated by the Town in conjunction with the administering agency.

2. The Contractor (or his agent, if any, designated by him as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

3. The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, or workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Town and Liaison Committee.

4. Records of employment referral orders, prepared by the Contractor, shall be available to the Town and to the Liaison Committee on request.

5. The Contractor shall prepare weekly reports in a form approved by the Town of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these shall be provided at the end of each week to the Town and to the Liaison Committee.

V If the Contractor shall use any subcontractor on any work performed under this contract, he shall take affirmative action to negotiate with qualified minority subcontractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the Office of Minority Business Assistance (within the Executive Office of Commerce and Development) or its designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

VI In the employment of journeymen, apprentices, trainees and advanced trainees, the Contractor shall give preference, first to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to perform the work to which the employment relates, and secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

VII A designee of the Town and a designee of the Liaison Committee shall each have right of access to the construction site.

VIII Compliance with Requirements

The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 116 dated May 1, 1975, and of Chapter 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this contract.

IX Non-Discrimination

The Contractor, in the performance of all work after award, and prior to completion of the contract work, will not discriminate on grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of subcontractors, or in the procurement of materials and rentals of equipment.

X Solicitations for Sub-Contracts, and for the Procurement of Material and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative to non-discrimination and affirmative action.

XI Bidders Certification Requirement

The following certification statement will be inserted in the bid document just above the bidder's signature, as a substitute for the present bidder certification form:

"The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained in the appendix EEO attached hereto, including compliance with the minority contractor compliance specified in Section V of said appendix. The contractor receiving the award of the contract shall be required to obtain from each of its subcontractors and submit to the contracting or administering agency prior to the performance of any work under said contract a certification by said subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the appendix EEO."

XII Contractor's Certification

The Contractor's certification form must be signed by all successful low bidder(s) prior to award by the contracting agency. (See attachment).

XIII Compliance - Information, Reports and Sanctions

1. The Contractor will provide all information and reports required by the administering agency or the Town on instructions issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the Town to affect the employment of personnel. This provision shall apply only to information pertinent to the Town's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency or the Town as appropriate and shall set forth what efforts he has made to obtain the information.

2. Whenever the administering agency, the Town, or the Liaison Committee believes the General Contractor or any Subcontractor may not be operating in compliance with the terms of this Section, the Town directly, or through its designated agent, shall conduct an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Section. If the Town or its agent finds the General Contractor or any subcontractor not in compliance, it shall make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgment of the Town or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Town shall make a final report of non-compliance, and recommend to the administering agency the imposition of one or more of the sanctions listed below. If, however, the Town believes the General Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. Within fourteen days of the receipt of the recommendations of the Town, the administering agency shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:

a. The recovery by the administering agency from the General Contractor of 1/100 of 1% of the contract award price or $1000 whichever sum is greater, in the nature of liquidated damages or, if a Subcontractor is in non-compliance, the recovery by the administering agency from the General Contractor, to be assessed by the General Contractor as a back charge against the Subcontractor, of 1/10 of 1% of the subcontract price, or $400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply.

b. The suspension of any payment or part thereof due under the contract until such time as the General Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract.

c. The termination or cancellation of the contract, in whole or in part, unless the General Contractor or any Subcontractor is able to demonstrate within a specified time his compliance with the terms of the contract.

d. The denial to the General Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering agency for a period of up to three years.

3. If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that he is in compliance with this Section, he may request the administering agency, in consultation with the Town, to suspend the sanctions conditionally, pending a final determination by the Town as to whether the Contractor is in compliance. Upon final determination of the Town, the administering agency, based on the recommendation of the Town, shall either lift the sanctions or reimpose them.

4. Sanctions enumerated under Sections XIII-2 shall not be imposed by the administering agency except after an adjudicatory proceeding, as that term is used M.G.L. c. 30A, has been conducted. No investigation by the Town or its agent shall be initiated without prior notice to the Contractor.

XIV Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

CONTRACTOR'S CERTIFICATION

CONTRACT NO. PW/15-20 RE BID Washington Street / Emerald Necklace Pedestrian & Bicycle Improvements

Prior to the execution of this Contract, the contractor must submit the following certification, which is deemed a part of the resulting Contract.

CONTRACTOR'S CERTIFICATION

_____ certifies that:

1. it intends to use the following listed construction trades in the work under the contract:

_____

_____

_____; and

2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and

3. will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions.

_____
(Signature of Authorized Representative of Contractor)

Company Name _____

Address _____

City _____ State _____ Zip _____

Tel. No. (_____) _____

SUBCONTRACTOR'S CERTIFICATION

CONTRACT NO. PW/15-20 RE BID Washington Street / Emerald Necklace Pedestrian & Bicycle Improvements

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting subcontract:

SUBCONTRACTOR'S CERTIFICATION

_____ certifies that:

1. it intends to use the following listed construction trades in the work under the subcontract:

_____

_____

_____; and

2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and

3. will obtain from each of the subcontractors prior to the award of any subcontract under this subcontract the subcontractor certification required by these bid conditions.

_____
(Signature of Authorized Representative of Subcontractor)

In order to ensure that the said subcontractor's, certification becomes a part of all subcontracts under the prime contract, no subcontract shall be executed until an authorized representative of the Town agency (or agencies) administering this project has determined, in writing, that the said certification has been incorporated in such subcontract, regardless of tier. Any subcontract executed without such written approval shall be void.

Company Name _____

Address _____

City _____ State _____ Zip _____

Tel. No. (_____) _____

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

RONALD L. WALKER, II
Secretary

WILLIAM D MCKINNEY
Director

Awarding Authority: Town of Brookline, Board of Selectmen

Contract Number: PW/15-20 ReBid **City/Town:** BROOKLINE

Description of Work: Washington Street Site Works - Traffic signals, street lights (20), pavement, utility installation, planting, 12 foot bike/ped path

Job Location: Instersection of Washington Street and Pond Ave

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **If an apprentice rate is not listed on the prevailing wage schedule for the trade in which an apprentice is registered with the DAS, the apprentice must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Issue Date: 11/24/2015 **Wage Request Number:** 20151124-009

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$31.65	$10.41	$9.33	$0.00	$51.39
	12/01/2015	$31.65	$10.41	$10.08	$0.00	$52.14
	06/01/2016	$32.15	$10.41	$10.08	$0.00	$52.64
	08/01/2016	$32.15	$10.91	$10.08	$0.00	$53.14
	12/01/2016	$32.15	$10.91	$10.89	$0.00	$53.95
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$31.72	$10.41	$9.33	$0.00	$51.46
	12/01/2015	$31.72	$10.41	$10.08	$0.00	$52.21
	06/01/2016	$32.22	$10.41	$10.08	$0.00	$52.71
	08/01/2016	$32.22	$10.91	$10.08	$0.00	$53.21
	12/01/2016	$32.22	$10.91	$10.89	$0.00	$54.02
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$31.84	$10.41	$9.33	$0.00	$51.58
	12/01/2015	$31.84	$10.41	$10.08	$0.00	$52.33
	06/01/2016	$32.34	$10.41	$10.08	$0.00	$52.83
	08/01/2016	$32.34	$10.91	$10.08	$0.00	$53.33
	12/01/2016	$32.34	$10.91	$10.89	$0.00	$54.14
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$88.29	$9.80	$19.23	$0.00	$117.32
AIR TRACK OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	12/01/2015	$36.60	$7.30	$13.20	$0.00	$57.10
	06/01/2016	$37.35	$7.30	$13.20	$0.00	$57.85
	12/01/2016	$38.35	$7.30	$13.20	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	06/01/2015	$33.43	$10.40	$5.95	$0.00	$49.78
	12/01/2015	$34.38	$10.40	$5.95	$0.00	$50.73
ASPHALT RAKER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 1*	06/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	12/01/2015	$36.60	$7.30	$13.20	$0.00	$57.10
	06/01/2016	$37.35	$7.30	$13.20	$0.00	$57.85
	12/01/2016	$38.35	$7.30	$13.20	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2015	$40.32	$6.97	$16.21	$0.00	$63.50
	01/01/2016	$41.62	$6.97	$16.21	$0.00	$64.80
	01/01/2017	$42.92	$6.97	$16.21	$0.00	$66.10

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$26.21	$6.97	$10.54	$0.00	$43.72
2	65	$26.21	$6.97	$10.54	$0.00	$43.72
3	70	$28.22	$6.97	$11.35	$0.00	$46.54
4	75	$30.24	$6.97	$12.16	$0.00	$49.37
5	80	$32.26	$6.97	$12.97	$0.00	$52.20
6	85	$34.27	$6.97	$13.78	$0.00	$55.02
7	90	$36.29	$6.97	$14.59	$0.00	$57.85
8	95	$38.30	$6.97	$15.40	$0.00	$60.67

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$27.05	$6.97	$10.54	$0.00	$44.56
2	65	$27.05	$6.97	$10.54	$0.00	$44.56
3	70	$29.13	$6.97	$11.35	$0.00	$47.45
4	75	$31.22	$6.97	$12.16	$0.00	$50.35
5	80	$33.30	$6.97	$12.97	$0.00	$53.24
6	85	$35.38	$6.97	$13.78	$0.00	$56.13
7	90	$37.46	$6.97	$14.59	$0.00	$59.02
8	95	$39.54	$6.97	$15.40	$0.00	$61.91

Notes:

Apprentice to Journeyworker Ratio:1:5

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (BOSTON)*	08/01/2015	$49.86	$10.18	$18.57	$0.00	$78.61
	02/01/2016	$50.43	$10.18	$18.57	$0.00	$79.18
	08/01/2016	$51.33	$10.18	$18.65	$0.00	$80.16
	02/01/2017	$51.90	$10.18	$18.65	$0.00	$80.73

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Boston*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.93	$10.18	$18.57	$0.00	$53.68
2	60	$29.92	$10.18	$18.57	$0.00	$58.67
3	70	$34.90	$10.18	$18.57	$0.00	$63.65
4	80	$39.89	$10.18	$18.57	$0.00	$68.64
5	90	$44.87	$10.18	$18.57	$0.00	$73.62

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.22	$10.18	$18.57	$0.00	$53.97
2	60	$30.26	$10.18	$18.57	$0.00	$59.01
3	70	$35.30	$10.18	$18.57	$0.00	$64.05
4	80	$40.34	$10.18	$18.57	$0.00	$69.09
5	90	$45.39	$10.18	$18.57	$0.00	$74.14

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$36.20	$7.30	$13.40	$0.00	$56.90
	12/01/2015	$36.95	$7.30	$13.40	$0.00	$57.65
	06/01/2016	$37.70	$7.30	$13.40	$0.00	$58.40
	12/01/2016	$38.70	$7.30	$13.40	$0.00	$59.40
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$35.05	$7.30	$13.40	$0.00	$55.75
	12/01/2015	$35.80	$7.30	$13.40	$0.00	$56.50
	06/01/2016	$36.55	$7.30	$13.40	$0.00	$57.25
	12/01/2016	$37.55	$7.30	$13.40	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$35.05	$7.30	$13.40	$0.00	$55.75
	12/01/2015	$35.80	$7.30	$13.40	$0.00	$56.50
	06/01/2016	$36.55	$7.30	$13.40	$0.00	$57.25
	12/01/2016	$37.55	$7.30	$13.40	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 1 (Metro Boston)*	03/01/2015	$42.30	$9.80	$16.48	$0.00	$68.58

Apprentice - *CARPENTER - Zone 1 Metro Boston*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.15	$9.80	$1.63	$0.00	$32.58
2	60	$25.38	$9.80	$1.63	$0.00	$36.81
3	70	$29.61	$9.80	$11.59	$0.00	$51.00
4	75	$31.73	$9.80	$11.59	$0.00	$53.12
5	80	$33.84	$9.80	$13.22	$0.00	$56.86
6	80	$33.84	$9.80	$13.22	$0.00	$56.86
7	90	$38.07	$9.80	$14.85	$0.00	$62.72
8	90	$38.07	$9.80	$14.85	$0.00	$62.72

Notes:

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (BOSTON)*	07/01/2015	$45.82	$10.90	$18.71	$1.30	$76.73
	01/01/2016	$46.44	$10.90	$18.71	$1.30	$77.35

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.91	$10.90	$12.21	$0.00	$46.02
2	60	$27.49	$10.90	$13.71	$1.30	$53.40
3	65	$29.78	$10.90	$14.71	$1.30	$56.69
4	70	$32.07	$10.90	$15.71	$1.30	$59.98
5	75	$34.37	$10.90	$16.71	$1.30	$63.28
6	80	$36.66	$10.90	$17.71	$1.30	$66.57
7	90	$41.24	$10.90	$18.71	$1.30	$72.15

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.22	$10.90	$12.21	$0.00	$46.33
2	60	$27.86	$10.90	$13.71	$1.30	$53.77
3	65	$30.19	$10.90	$14.71	$1.30	$57.10
4	70	$32.51	$10.90	$15.71	$1.30	$60.42
5	75	$34.83	$10.90	$16.71	$1.30	$63.74
6	80	$37.15	$10.90	$17.71	$1.30	$67.06
7	90	$41.80	$10.90	$18.71	$1.30	$72.71

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$43.83	$10.00	$14.55	$0.00	$68.38
	12/01/2015	$45.08	$10.00	$14.55	$0.00	$69.63
	06/01/2016	$45.83	$10.00	$14.55	$0.00	$70.38
	12/01/2016	$47.08	$10.00	$14.55	$0.00	$71.63
	06/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
	12/01/2017	$49.08	$10.00	$14.55	$0.00	$73.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$29.61	$10.00	$14.55	$0.00	$54.16
	12/01/2015	$30.48	$10.00	$14.55	$0.00	$55.03
	06/01/2016	$31.00	$10.00	$14.55	$0.00	$55.55
	12/01/2016	$31.87	$10.00	$14.55	$0.00	$56.42
	06/01/2017	$32.56	$10.00	$14.55	$0.00	$57.11
	12/01/2017	$33.25	$10.00	$14.55	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2015	$48.56	$7.85	$16.10	$0.00	$72.51
	01/01/2016	$49.51	$7.85	$16.10	$0.00	$73.46
	07/01/2016	$50.46	$7.85	$16.10	$0.00	$74.41
	01/01/2017	$51.41	$7.85	$16.10	$0.00	$75.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.28	$7.85	$0.00	$0.00	$32.13
2	55	$26.71	$7.85	$3.66	$0.00	$38.22
3	60	$29.14	$7.85	$3.99	$0.00	$40.98
4	65	$31.56	$7.85	$4.32	$0.00	$43.73
5	70	$33.99	$7.85	$14.11	$0.00	$55.95
6	75	$36.42	$7.85	$14.44	$0.00	$58.71
7	80	$38.85	$7.85	$14.77	$0.00	$61.47
8	90	$43.70	$7.85	$15.44	$0.00	$66.99

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.76	$7.85	$0.00	$0.00	$32.61
2	55	$27.23	$7.85	$3.66	$0.00	$38.74
3	60	$29.71	$7.85	$3.99	$0.00	$41.55
4	65	$32.18	$7.85	$4.32	$0.00	$44.35
5	70	$34.66	$7.85	$14.11	$0.00	$56.62
6	75	$37.13	$7.85	$14.44	$0.00	$59.42
7	80	$39.61	$7.85	$14.77	$0.00	$62.23
8	90	$44.56	$7.85	$15.44	$0.00	$67.85

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	06/01/2015	$35.25	$7.30	$13.20	$0.00	$55.75
	12/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	06/01/2015	$36.25	$7.30	$13.20	$0.00	$56.75
	12/01/2015	$37.00	$7.30	$13.20	$0.00	$57.50
DEMO: BURNERS *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	06/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
	12/01/2015	$36.75	$7.30	$13.20	$0.00	$57.25
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	06/01/2015	$36.25	$7.30	$13.20	$0.00	$56.75
	12/01/2015	$37.00	$7.30	$13.20	$0.00	$57.50
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 1*	06/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
	12/01/2015	$36.75	$7.30	$13.20	$0.00	$57.25

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 1*	06/01/2015	$35.25	$7.30	$13.20	$0.00	$55.75
	12/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$58.86	$9.80	$19.23	$0.00	$87.89
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$42.04	$9.80	$19.23	$0.00	$71.07
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$63.06	$9.80	$19.23	$0.00	$92.09
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$88.23	$9.80	$19.23	$0.00	$117.26
DRAWBRIDGE OPERATOR (Construction) *ELECTRICIANS LOCAL 103*	09/01/2015	$45.67	$13.00	$15.89	$0.00	$74.56
	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN *ELECTRICIANS LOCAL 103*	09/01/2015	$45.67	$13.00	$15.89	$0.00	$74.56
	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.27	$13.00	$0.55	$0.00	$31.82
2	40	$18.27	$13.00	$0.55	$0.00	$31.82
3	45	$20.55	$13.00	$11.86	$0.00	$45.41
4	45	$20.55	$13.00	$11.86	$0.00	$45.41
5	50	$22.84	$13.00	$12.23	$0.00	$48.07
6	55	$25.12	$13.00	$12.58	$0.00	$50.70
7	60	$27.40	$13.00	$12.95	$0.00	$53.35
8	65	$29.69	$13.00	$13.32	$0.00	$56.01
9	70	$31.97	$13.00	$13.69	$0.00	$58.66
10	75	$34.25	$13.00	$14.06	$0.00	$61.31

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.47	$13.00	$0.55	$0.00	$32.02
2	40	$18.47	$13.00	$0.55	$0.00	$32.02
3	45	$20.78	$13.00	$11.84	$0.00	$45.62
4	45	$20.78	$13.00	$11.84	$0.00	$45.62
5	50	$23.09	$13.00	$12.71	$0.00	$48.80
6	55	$25.39	$13.00	$13.07	$0.00	$51.46
7	60	$27.70	$13.00	$13.39	$0.00	$54.09
8	65	$30.01	$13.00	$13.81	$0.00	$56.82
9	70	$32.32	$13.00	$14.18	$0.00	$59.50
10	75	$34.63	$13.00	$14.55	$0.00	$62.18

Notes: :

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2015	$53.30	$13.58	$14.21	$0.00	$81.09
	01/01/2016	$54.53	$14.43	$14.96	$0.00	$83.92
	01/01/2017	$55.86	$15.28	$15.71	$0.00	$86.85

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.65	$13.58	$0.00	$0.00	$40.23
2	55	$29.32	$13.58	$14.21	$0.00	$57.11
3	65	$34.65	$13.58	$14.21	$0.00	$62.44
4	70	$37.31	$13.58	$14.21	$0.00	$65.10
5	80	$42.64	$13.58	$14.21	$0.00	$70.43

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.27	$14.43	$0.00	$0.00	$41.70
2	55	$29.99	$14.43	$14.96	$0.00	$59.38
3	65	$35.44	$14.43	$14.96	$0.00	$64.83
4	70	$38.17	$14.43	$14.96	$0.00	$67.56
5	80	$43.62	$14.43	$14.96	$0.00	$73.01

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2015	$37.31	$13.58	$14.21	$0.00	$65.10
	01/01/2016	$38.17	$14.43	$14.96	$0.00	$67.56
	01/01/2017	$39.10	$15.28	$15.71	$0.00	$70.09
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2015	$40.49	$10.00	$14.55	$0.00	$65.04
	05/01/2016	$41.38	$10.00	$14.55	$0.00	$65.93
	11/01/2016	$41.97	$10.00	$14.55	$0.00	$66.52
	05/01/2017	$42.85	$10.00	$14.55	$0.00	$67.40
	11/01/2017	$43.58	$10.00	$14.55	$0.00	$68.13
	05/01/2018	$44.29	$10.00	$14.55	$0.00	$68.84
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2015	$41.93	$10.00	$14.55	$0.00	$66.48
	05/01/2016	$42.82	$10.00	$14.55	$0.00	$67.37
	11/01/2016	$43.42	$10.00	$14.55	$0.00	$67.97
	05/01/2017	$44.31	$10.00	$14.55	$0.00	$68.86
	11/01/2017	$45.04	$10.00	$14.55	$0.00	$69.59
	05/01/2018	$45.76	$10.00	$14.55	$0.00	$70.31
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2015	$21.71	$10.00	$14.55	$0.00	$46.26
	05/01/2016	$22.23	$10.00	$14.55	$0.00	$46.78
	11/01/2016	$22.58	$10.00	$14.55	$0.00	$47.13
	05/01/2017	$23.11	$10.00	$14.55	$0.00	$47.66
	11/01/2017	$23.53	$10.00	$14.55	$0.00	$48.08
	05/01/2018	$23.96	$10.00	$14.55	$0.00	$48.51
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	09/01/2015	$45.67	$13.00	$15.89	$0.00	$74.56
	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING*ELECTRICIANS LOCAL 103* For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"	09/01/2015	$34.25	$13.00	$14.06	$0.00	$61.31
	03/01/2016	$34.63	$13.00	$14.55	$0.00	$62.18
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$35.64	$10.00	$14.55	$0.00	$60.19
	12/01/2015	$36.69	$10.00	$14.55	$0.00	$61.24
	06/01/2016	$37.31	$10.00	$14.55	$0.00	$61.86
	12/01/2016	$38.35	$10.00	$14.55	$0.00	$62.90
	06/01/2017	$39.19	$10.00	$14.55	$0.00	$63.74
	12/01/2017	$40.02	$10.00	$14.55	$0.00	$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER *LABORERS - ZONE 1*	06/01/2015	$20.50	$7.30	$13.20	$0.00	$41.00
	12/01/2015	$20.50	$7.30	$13.20	$0.00	$41.00
	06/01/2016	$20.50	$7.30	$13.20	$0.00	$41.00
	12/01/2016	$20.50	$7.30	$13.20	$0.00	$41.00
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	09/01/2015	$41.59	$9.80	$17.53	$0.00	$68.92

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.80	$9.80	$1.79	$0.00	$32.39
2	55	$22.87	$9.80	$1.79	$0.00	$34.46
3	60	$24.95	$9.80	$12.16	$0.00	$46.91
4	65	$27.03	$9.80	$12.16	$0.00	$48.99
5	70	$29.11	$9.80	$13.95	$0.00	$52.86
6	75	$31.19	$9.80	$13.95	$0.00	$54.94
7	80	$33.27	$9.80	$15.74	$0.00	$58.81
8	85	$35.35	$9.80	$15.74	$0.00	$60.89

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$29.61	$10.00	$14.55	$0.00	$54.16
	12/01/2015	$30.48	$10.00	$14.55	$0.00	$55.03
	06/01/2016	$31.00	$10.00	$14.55	$0.00	$55.55
	12/01/2016	$31.87	$10.00	$14.55	$0.00	$56.42
	06/01/2017	$32.56	$10.00	$14.55	$0.00	$57.11
	12/01/2017	$33.25	$10.00	$14.55	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 1)*	07/01/2015	$43.85	$7.85	$16.10	$0.00	$67.80
	01/01/2016	$44.80	$7.85	$16.10	$0.00	$68.75
	07/01/2016	$45.75	$7.85	$16.10	$0.00	$69.70
	01/01/2017	$46.70	$7.85	$16.10	$0.00	$70.65

Apprentice - *GLAZIER - Local 35 Zone 1*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.93	$7.85	$0.00	$0.00	$29.78
2	55	$24.12	$7.85	$3.66	$0.00	$35.63
3	60	$26.31	$7.85	$3.99	$0.00	$38.15
4	65	$28.50	$7.85	$4.32	$0.00	$40.67
5	70	$30.70	$7.85	$14.11	$0.00	$52.66
6	75	$32.89	$7.85	$14.44	$0.00	$55.18
7	80	$35.08	$7.85	$14.77	$0.00	$57.70
8	90	$39.47	$7.85	$15.44	$0.00	$62.76

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.40	$7.85	$0.00	$0.00	$30.25
2	55	$24.64	$7.85	$3.66	$0.00	$36.15
3	60	$26.88	$7.85	$3.99	$0.00	$38.72
4	65	$29.12	$7.85	$4.32	$0.00	$41.29
5	70	$31.36	$7.85	$14.11	$0.00	$53.32
6	75	$33.60	$7.85	$14.44	$0.00	$55.89
7	80	$35.84	$7.85	$14.77	$0.00	$58.46
8	90	$40.32	$7.85	$15.44	$0.00	$63.61

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 06/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$23.56	$10.00	$0.00	$0.00	$33.56
2	60	$25.70	$10.00	$14.55	$0.00	$50.25
3	65	$27.84	$10.00	$14.55	$0.00	$52.39
4	70	$29.98	$10.00	$14.55	$0.00	$54.53
5	75	$32.12	$10.00	$14.55	$0.00	$56.67
6	80	$34.26	$10.00	$14.55	$0.00	$58.81
7	85	$36.41	$10.00	$14.55	$0.00	$60.96
8	90	$38.55	$10.00	$14.55	$0.00	$63.10

Effective Date - 12/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$24.24	$10.00	$0.00	$0.00	$34.24
2	60	$26.45	$10.00	$14.55	$0.00	$51.00
3	65	$28.65	$10.00	$14.55	$0.00	$53.20
4	70	$30.86	$10.00	$14.55	$0.00	$55.41
5	75	$33.06	$10.00	$14.55	$0.00	$57.61
6	80	$35.26	$10.00	$14.55	$0.00	$59.81
7	85	$37.47	$10.00	$14.55	$0.00	$62.02
8	90	$39.67	$10.00	$14.55	$0.00	$64.22

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	08/01/2015	$43.31	$10.20	$21.48	$2.25	$77.24
	02/01/2016	$44.31	$10.20	$21.48	$2.25	$78.24
	08/01/2016	$45.46	$10.20	$21.48	$2.25	$79.39
	02/01/2017	$46.56	$10.20	$21.48	$2.25	$80.49
	08/01/2017	$47.66	$10.20	$21.48	$2.25	$81.59
	02/01/2018	$48.81	$10.20	$21.48	$2.25	$82.74

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	09/01/2015	$45.67	$13.00	$15.89	$0.00	$74.56
	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56

For apprentice rates see "Apprentice- ELECTRICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	08/01/2015	$43.31	$10.20	$21.48	$2.25	$77.24
	02/01/2016	$44.31	$10.20	$21.48	$2.25	$78.24
	08/01/2016	$45.46	$10.20	$21.48	$2.25	$79.39
	02/01/2017	$46.56	$10.20	$21.48	$2.25	$80.49
	08/01/2017	$47.66	$10.20	$21.48	$2.25	$81.59
	02/01/2018	$48.81	$10.20	$21.48	$2.25	$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 1*	06/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	12/01/2015	$36.60	$7.30	$13.20	$0.00	$57.10
	06/01/2016	$37.35	$7.30	$13.20	$0.00	$57.85
	12/01/2016	$38.35	$7.30	$13.20	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2015	$43.81	$11.50	$13.80	$0.00	$69.11
	09/01/2016	$45.81	$11.50	$13.80	$0.00	$71.11
	09/01/2017	$47.81	$11.50	$13.80	$0.00	$73.11
	09/01/2018	$50.06	$11.50	$13.80	$0.00	$75.36
	09/01/2019	$52.56	$11.50	$13.80	$0.00	$77.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.91	$11.50	$10.05	$0.00	$43.46
2	60	$26.29	$11.50	$10.80	$0.00	$48.59
3	70	$30.67	$11.50	$11.55	$0.00	$53.72
4	80	$35.05	$11.50	$12.30	$0.00	$58.85

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.91	$11.50	$10.05	$0.00	$44.46
2	60	$27.49	$11.50	$10.80	$0.00	$49.79
3	70	$32.07	$11.50	$11.55	$0.00	$55.12
4	80	$36.65	$11.50	$12.30	$0.00	$60.45

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (BOSTON AREA)*	09/16/2015	$42.40	$7.80	$20.85	$0.00	$71.05
	03/16/2016	$43.40	$7.80	$20.85	$0.00	$72.05
	09/16/2016	$44.05	$7.80	$20.85	$0.00	$72.70
	03/16/2017	$44.65	$7.80	$20.85	$0.00	$73.30

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Boston*

Effective Date - 09/16/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.44	$7.80	$20.85	$0.00	$54.09
2	70	$29.68	$7.80	$20.85	$0.00	$58.33
3	75	$31.80	$7.80	$20.85	$0.00	$60.45
4	80	$33.92	$7.80	$20.85	$0.00	$62.57
5	85	$36.04	$7.80	$20.85	$0.00	$64.69
6	90	$38.16	$7.80	$20.85	$0.00	$66.81

Effective Date - 03/16/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.04	$7.80	$20.85	$0.00	$54.69
2	70	$30.38	$7.80	$20.85	$0.00	$59.03
3	75	$32.55	$7.80	$20.85	$0.00	$61.20
4	80	$34.72	$7.80	$20.85	$0.00	$63.37
5	85	$36.89	$7.80	$20.85	$0.00	$65.54
6	90	$39.06	$7.80	$20.85	$0.00	$67.71

Notes:

** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 1*

Effective Date - 06/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.06	$7.30	$13.20	$0.00	$41.56
2	70	$24.57	$7.30	$13.20	$0.00	$45.07
3	80	$28.08	$7.30	$13.20	$0.00	$48.58
4	90	$31.59	$7.30	$13.20	$0.00	$52.09

Effective Date - 12/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.51	$7.30	$13.20	$0.00	$42.01
2	70	$25.10	$7.30	$13.20	$0.00	$45.60
3	80	$28.68	$7.30	$13.20	$0.00	$49.18
4	90	$32.27	$7.30	$13.20	$0.00	$52.77

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 1*	06/01/2015	$35.25	$7.30	$13.20	$0.00	$55.75
	12/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2015	$38.08	$10.18	$17.25	$0.00	$65.51
	02/01/2016	$38.53	$10.18	$17.25	$0.00	$65.96
	08/01/2016	$39.23	$10.18	$17.33	$0.00	$66.74
	02/01/2017	$39.69	$10.18	$17.33	$0.00	$67.20

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.04	$10.18	$17.25	$0.00	$46.47
2	60	$22.85	$10.18	$17.25	$0.00	$50.28
3	70	$26.66	$10.18	$17.25	$0.00	$54.09
4	80	$30.46	$10.18	$17.25	$0.00	$57.89
5	90	$34.27	$10.18	$17.25	$0.00	$61.70

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.27	$10.18	$17.25	$0.00	$46.70
2	60	$23.12	$10.18	$17.25	$0.00	$50.55
3	70	$26.97	$10.18	$17.25	$0.00	$54.40
4	80	$30.82	$10.18	$17.25	$0.00	$58.25
5	90	$34.68	$10.18	$17.25	$0.00	$62.11

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2015	$49.90	$10.18	$18.57	$0.00	$78.65
	02/01/2016	$50.47	$10.18	$18.57	$0.00	$79.22
	08/01/2016	$51.37	$10.18	$18.65	$0.00	$80.20
	02/01/2017	$51.94	$10.18	$18.65	$0.00	$80.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.95	$10.18	$18.57	$0.00	$53.70
2	60	$29.94	$10.18	$18.57	$0.00	$58.69
3	70	$34.93	$10.18	$18.57	$0.00	$63.68
4	80	$39.92	$10.18	$18.57	$0.00	$68.67
5	90	$44.91	$10.18	$18.57	$0.00	$73.66

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.24	$10.18	$18.57	$0.00	$53.99
2	60	$30.28	$10.18	$18.57	$0.00	$59.03
3	70	$35.33	$10.18	$18.57	$0.00	$64.08
4	80	$40.38	$10.18	$18.57	$0.00	$69.13
5	90	$45.42	$10.18	$18.57	$0.00	$74.17

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) *MILLWRIGHTS LOCAL 1121 - Zone 2*	04/01/2015	$34.69	$9.80	$16.21	$0.00	$60.70

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 2*

Effective Date - 04/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$19.08	$9.80	$4.48	$0.00	$33.36
2	65	$22.55	$9.80	$13.36	$0.00	$45.71
3	75	$26.02	$9.80	$14.18	$0.00	$50.00
4	85	$29.49	$9.80	$14.99	$0.00	$54.28

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$21.97	$10.00	$14.55	$0.00	$46.52
	12/01/2015	$22.62	$10.00	$14.55	$0.00	$47.17
	06/01/2016	$23.01	$10.00	$14.55	$0.00	$47.56
	12/01/2016	$23.66	$10.00	$14.55	$0.00	$48.21
	06/01/2017	$24.17	$10.00	$14.55	$0.00	$48.72
	12/01/2017	$24.69	$10.00	$14.55	$0.00	$49.24
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$25.68	$10.00	$14.55	$0.00	$50.23
	12/01/2015	$26.43	$10.00	$14.55	$0.00	$50.98
	06/01/2016	$26.89	$10.00	$14.55	$0.00	$51.44
	12/01/2016	$27.64	$10.00	$14.55	$0.00	$52.19
	06/01/2017	$28.24	$10.00	$14.55	$0.00	$52.79
	12/01/2017	$28.85	$10.00	$14.55	$0.00	$53.40
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2015	$48.56	$7.85	$16.10	$0.00	$72.51
	01/01/2016	$49.51	$7.85	$16.10	$0.00	$73.46
	07/01/2016	$50.46	$7.85	$16.10	$0.00	$74.41
	01/01/2017	$51.41	$7.85	$16.10	$0.00	$75.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.28	$7.85	$0.00	$0.00	$32.13
2	55	$26.71	$7.85	$3.66	$0.00	$38.22
3	60	$29.14	$7.85	$3.99	$0.00	$40.98
4	65	$31.56	$7.85	$4.32	$0.00	$43.73
5	70	$33.99	$7.85	$14.11	$0.00	$55.95
6	75	$36.42	$7.85	$14.44	$0.00	$58.71
7	80	$38.85	$7.85	$14.77	$0.00	$61.47
8	90	$43.70	$7.85	$15.44	$0.00	$66.99

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.76	$7.85	$0.00	$0.00	$32.61
2	55	$27.23	$7.85	$3.66	$0.00	$38.74
3	60	$29.71	$7.85	$3.99	$0.00	$41.55
4	65	$32.18	$7.85	$4.32	$0.00	$44.35
5	70	$34.66	$7.85	$14.11	$0.00	$56.62
6	75	$37.13	$7.85	$14.44	$0.00	$59.42
7	80	$39.61	$7.85	$14.77	$0.00	$62.23
8	90	$44.56	$7.85	$15.44	$0.00	$67.85

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2015	$45.25	$7.85	$16.10	$0.00	$69.20
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	01/01/2016	$46.20	$7.85	$16.10	$0.00	$70.15
	07/01/2016	$47.15	$7.85	$16.10	$0.00	$71.10
	01/01/2017	$48.10	$7.85	$16.10	$0.00	$72.05

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - New*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.63	$7.85	$0.00	$0.00	$30.48
2	55	$24.89	$7.85	$3.66	$0.00	$36.40
3	60	$27.15	$7.85	$3.99	$0.00	$38.99
4	65	$29.41	$7.85	$4.32	$0.00	$41.58
5	70	$31.68	$7.85	$14.11	$0.00	$53.64
6	75	$33.94	$7.85	$14.44	$0.00	$56.23
7	80	$36.20	$7.85	$14.77	$0.00	$58.82
8	90	$40.73	$7.85	$15.44	$0.00	$64.02

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.10	$7.85	$0.00	$0.00	$30.95
2	55	$25.41	$7.85	$3.66	$0.00	$36.92
3	60	$27.72	$7.85	$3.99	$0.00	$39.56
4	65	$30.03	$7.85	$4.32	$0.00	$42.20
5	70	$32.34	$7.85	$14.11	$0.00	$54.30
6	75	$34.65	$7.85	$14.44	$0.00	$56.94
7	80	$36.96	$7.85	$14.77	$0.00	$59.58
8	90	$41.58	$7.85	$15.44	$0.00	$64.87

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2015	$43.31	$7.85	$16.10	$0.00	$67.26
	01/01/2016	$44.26	$7.85	$16.10	$0.00	$68.21
	07/01/2016	$45.21	$7.85	$16.10	$0.00	$69.16
	01/01/2017	$46.16	$7.85	$16.10	$0.00	$70.11

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - Repaint*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.66	$7.85	$0.00	$0.00	$29.51
2	55	$23.82	$7.85	$3.66	$0.00	$35.33
3	60	$25.99	$7.85	$3.99	$0.00	$37.83
4	65	$28.15	$7.85	$4.32	$0.00	$40.32
5	70	$30.32	$7.85	$14.11	$0.00	$52.28
6	75	$32.48	$7.85	$14.44	$0.00	$54.77
7	80	$34.65	$7.85	$14.77	$0.00	$57.27
8	90	$38.98	$7.85	$15.44	$0.00	$62.27

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.13	$7.85	$0.00	$0.00	$29.98
2	55	$24.34	$7.85	$3.66	$0.00	$35.85
3	60	$26.56	$7.85	$3.99	$0.00	$38.40
4	65	$28.77	$7.85	$4.32	$0.00	$40.94
5	70	$30.98	$7.85	$14.11	$0.00	$52.94
6	75	$33.20	$7.85	$14.44	$0.00	$55.49
7	80	$35.41	$7.85	$14.77	$0.00	$58.03
8	90	$39.83	$7.85	$15.44	$0.00	$63.12

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS) *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For Apprentice rates see "Apprentice- LABORER"						
PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	07/01/2015	$43.85	$7.85	$16.10	$0.00	$67.80
	01/01/2016	$44.80	$7.85	$16.10	$0.00	$68.75
	07/01/2016	$45.75	$7.85	$16.10	$0.00	$69.70
	01/01/2017	$46.70	$7.85	$16.10	$0.00	$70.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER - Local 35 Zone 1 - BRUSH NEW*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.93	$7.85	$0.00	$0.00	$29.78
2	55	$24.12	$7.85	$3.66	$0.00	$35.63
3	60	$26.31	$7.85	$3.99	$0.00	$38.15
4	65	$28.50	$7.85	$4.32	$0.00	$40.67
5	70	$30.70	$7.85	$14.11	$0.00	$52.66
6	75	$32.89	$7.85	$14.44	$0.00	$55.18
7	80	$35.08	$7.85	$14.77	$0.00	$57.70
8	90	$39.47	$7.85	$15.44	$0.00	$62.76

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.40	$7.85	$0.00	$0.00	$30.25
2	55	$24.64	$7.85	$3.66	$0.00	$36.15
3	60	$26.88	$7.85	$3.99	$0.00	$38.72
4	65	$29.12	$7.85	$4.32	$0.00	$41.29
5	70	$31.36	$7.85	$14.11	$0.00	$53.32
6	75	$33.60	$7.85	$14.44	$0.00	$55.89
7	80	$35.84	$7.85	$14.77	$0.00	$58.46
8	90	$40.32	$7.85	$15.44	$0.00	$63.61

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2015	$41.91	$7.85	$16.10	$0.00	$65.86
	01/01/2016	$42.86	$7.85	$16.10	$0.00	$66.81
	07/01/2016	$43.81	$7.85	$16.10	$0.00	$67.76
	01/01/2017	$44.76	$7.85	$16.10	$0.00	$68.71

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - BRUSH REPAINT*

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.96	$7.85	$0.00	$0.00	$28.81
2	55	$23.05	$7.85	$3.66	$0.00	$34.56
3	60	$25.15	$7.85	$3.99	$0.00	$36.99
4	65	$27.24	$7.85	$4.32	$0.00	$39.41
5	70	$29.34	$7.85	$14.11	$0.00	$51.30
6	75	$31.43	$7.85	$14.44	$0.00	$53.72
7	80	$33.53	$7.85	$14.77	$0.00	$56.15
8	90	$37.72	$7.85	$15.44	$0.00	$61.01

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.43	$7.85	$0.00	$0.00	$29.28
2	55	$23.57	$7.85	$3.66	$0.00	$35.08
3	60	$25.72	$7.85	$3.99	$0.00	$37.56
4	65	$27.86	$7.85	$4.32	$0.00	$40.03
5	70	$30.00	$7.85	$14.11	$0.00	$51.96
6	75	$32.15	$7.85	$14.44	$0.00	$54.44
7	80	$34.29	$7.85	$14.77	$0.00	$56.91
8	90	$38.57	$7.85	$15.44	$0.00	$61.86

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.28	$9.07	$8.00	$0.00	$47.35
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$42.04	$9.80	$19.23	$0.00	$71.07
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$42.04	$9.80	$19.23	$0.00	$71.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.02	$9.80	$19.23	$0.00	$50.05
2	60	$25.22	$9.80	$19.23	$0.00	$54.25
3	70	$29.43	$9.80	$19.23	$0.00	$58.46
4	75	$31.53	$9.80	$19.23	$0.00	$60.56
5	80	$33.63	$9.80	$19.23	$0.00	$62.66
6	80	$33.63	$9.80	$19.23	$0.00	$62.66
7	90	$37.84	$9.80	$19.23	$0.00	$66.87
8	90	$37.84	$9.80	$19.23	$0.00	$66.87

Notes:

Apprentice to Journeyworker Ratio:1:3

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$19.88	$9.70	$7.50	$0.00	$37.08
2	45	$22.36	$9.70	$16.89	$0.00	$48.95
3	60	$29.81	$9.70	$16.89	$0.00	$56.40
4	70	$34.78	$9.70	$16.89	$0.00	$61.37
5	80	$39.75	$9.70	$16.89	$0.00	$66.34

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.28	$9.70	$7.50	$0.00	$37.48
2	45	$22.81	$9.70	$16.89	$0.00	$49.40
3	60	$30.41	$9.70	$16.89	$0.00	$57.00
4	70	$35.48	$9.70	$16.89	$0.00	$62.07
5	80	$40.55	$9.70	$16.89	$0.00	$67.14

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.

Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPELAYER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	09/01/2015	$50.46	$10.82	$15.14	$0.00	$76.42
	03/01/2016	$51.61	$10.82	$15.14	$0.00	$77.57
	09/01/2016	$52.66	$10.82	$15.14	$0.00	$78.62
	03/01/2017	$53.66	$10.82	$15.14	$0.00	$79.62

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$17.66	$10.82	$5.63	$0.00	$34.11
2	40	$20.18	$10.82	$6.37	$0.00	$37.37
3	55	$27.75	$10.82	$8.56	$0.00	$47.13
4	65	$32.80	$10.82	$10.03	$0.00	$53.65
5	75	$37.85	$10.82	$11.48	$0.00	$60.15

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$18.06	$10.82	$5.61	$0.00	$34.49
2	40	$20.64	$10.82	$6.36	$0.00	$37.82
3	55	$28.39	$10.82	$8.56	$0.00	$47.77
4	65	$33.55	$10.82	$10.02	$0.00	$54.39
5	75	$38.71	$10.82	$11.48	$0.00	$61.01

Notes:

** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$56.90 Step5 with lic$63.40

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER *LABORERS - ZONE 1*	06/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	12/01/2015	$36.85	$7.30	$13.20	$0.00	$57.35
	06/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
	12/01/2016	$38.60	$7.30	$13.20	$0.00	$59.10
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$29.61	$10.00	$14.55	$0.00	$54.16
	12/01/2015	$30.48	$10.00	$14.55	$0.00	$55.03
	06/01/2016	$31.00	$10.00	$14.55	$0.00	$55.55
	12/01/2016	$31.87	$10.00	$14.55	$0.00	$56.42
	06/01/2017	$32.56	$10.00	$14.55	$0.00	$57.11
	12/01/2017	$33.25	$10.00	$14.55	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/10 (Drivers Hired After 4/30/2010)*TEAMSTERS LOCAL 25a*	07/01/2015	$27.88	$7.98	$8.92	$0.00	$44.78
	05/01/2016	$28.03	$7.98	$9.31	$0.00	$45.32
	07/01/2016	$28.03	$8.23	$9.31	$0.00	$45.57
	05/01/2017	$28.18	$8.23	$9.72	$0.00	$46.13
	07/01/2017	$28.18	$8.48	$9.72	$0.00	$46.38
READY-MIX CONCRETE DRIVER *TEAMSTERS LOCAL 25a*	07/01/2015	$31.14	$7.98	$8.92	$0.00	$48.04
	05/01/2016	$31.29	$7.98	$9.31	$0.00	$48.58
	07/01/2016	$31.29	$8.23	$9.31	$0.00	$48.83
	05/01/2017	$31.44	$8.23	$9.72	$0.00	$49.39
	07/01/2017	$31.44	$8.48	$9.72	$0.00	$49.64
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) *CARPENTERS -ZONE 1 (Residential Wood)*	04/01/2011	$37.25	$8.67	$15.51	$0.00	$61.43
RESIDENTIAL WOOD FRAME CARPENTER ** ** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.*CARPENTERS -ZONE 1 (Residential Wood)*	05/01/2011	$27.49	$6.34	$6.23	$0.00	$40.06

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER (Residential Wood Frame) - Zone 1*

Effective Date - 05/01/2011

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.49	$6.34	$0.00	$0.00	$22.83
2	60	$16.49	$6.34	$6.23	$0.00	$29.06
3	65	$17.87	$6.34	$6.23	$0.00	$30.44
4	70	$19.24	$6.34	$6.23	$0.00	$31.81
5	75	$20.62	$6.34	$6.23	$0.00	$33.19
6	80	$21.99	$6.34	$6.23	$0.00	$34.56
7	85	$23.37	$6.34	$6.23	$0.00	$35.94
8	90	$24.74	$6.34	$6.23	$0.00	$37.31

Notes:

Apprentice to Journeyworker Ratio:1:5

RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	08/01/2015	$40.11	$11.00	$12.00	$0.00	$63.11
	02/01/2016	$41.01	$11.00	$12.00	$0.00	$64.01

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 33*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.06	$11.00	$3.38	$0.00	$34.44
2	60	$24.07	$11.00	$12.00	$0.00	$47.07
3	65	$26.07	$11.00	$12.00	$0.00	$49.07
4	75	$30.08	$11.00	$12.00	$0.00	$53.08
5	85	$34.09	$11.00	$12.00	$0.00	$57.09

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.51	$11.00	$3.38	$0.00	$34.89
2	60	$24.61	$11.00	$12.00	$0.00	$47.61
3	65	$26.66	$11.00	$12.00	$0.00	$49.66
4	75	$30.76	$11.00	$12.00	$0.00	$53.76
5	85	$34.86	$11.00	$12.00	$0.00	$57.86

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	08/01/2015	$40.36	$11.00	$12.00	$0.00	$63.36
	02/01/2016	$41.26	$11.00	$12.00	$0.00	$64.26
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	08/01/2015	$43.31	$10.20	$21.48	$2.25	$77.24
	02/01/2016	$44.31	$10.20	$21.48	$2.25	$78.24
	08/01/2016	$45.46	$10.20	$21.48	$2.25	$79.39
	02/01/2017	$46.56	$10.20	$21.48	$2.25	$80.49
	08/01/2017	$47.66	$10.20	$21.48	$2.25	$81.59
	02/01/2018	$48.81	$10.20	$21.48	$2.25	$82.74

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.32	$10.20	$4.90	$0.00	$32.42
2	40	$17.32	$10.20	$4.90	$0.00	$32.42
3	45	$19.49	$10.20	$9.59	$1.18	$40.46
4	45	$19.49	$10.20	$9.59	$1.18	$40.46
5	50	$21.66	$10.20	$10.45	$1.27	$43.58
6	50	$21.66	$10.20	$10.70	$1.28	$43.84
7	60	$25.99	$10.20	$12.17	$1.45	$49.81
8	65	$28.15	$10.20	$13.04	$1.54	$52.93
9	75	$32.48	$10.20	$14.76	$1.72	$59.16
10	85	$36.81	$10.20	$15.98	$1.89	$64.88

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.72	$10.20	$4.90	$0.00	$32.82
2	40	$17.72	$10.20	$4.90	$0.00	$32.82
3	45	$19.94	$10.20	$9.59	$1.19	$40.92
4	45	$19.94	$10.20	$9.59	$1.19	$40.92
5	50	$22.16	$10.20	$10.45	$1.28	$44.09
6	50	$22.16	$10.20	$10.70	$1.29	$44.35
7	60	$26.59	$10.20	$12.17	$1.47	$50.43
8	65	$28.80	$10.20	$13.04	$1.56	$53.60
9	75	$33.23	$10.20	$14.76	$1.75	$59.94
10	85	$37.66	$10.20	$15.98	$1.92	$65.76

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SIGN ERECTOR *PAINTERS LOCAL 35 - ZONE 1*	06/01/2013	$25.81	$7.07	$7.05	$0.00	$39.93

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SIGN ERECTOR - Local 35 Zone 1*

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$12.91	$7.07	$0.00	$0.00	$19.98
2	55	$14.20	$7.07	$2.45	$0.00	$23.72
3	60	$15.49	$7.07	$2.45	$0.00	$25.01
4	65	$16.78	$7.07	$2.45	$0.00	$26.30
5	70	$18.07	$7.07	$7.05	$0.00	$32.19
6	75	$19.36	$7.07	$7.05	$0.00	$33.48
7	80	$20.65	$7.07	$7.05	$0.00	$34.77
8	85	$21.94	$7.07	$7.05	$0.00	$36.06
9	90	$23.23	$7.07	$7.05	$0.00	$37.35

Notes:

Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$31.94	$10.41	$9.33	$0.00	$51.68
	12/01/2015	$31.94	$10.41	$10.08	$0.00	$52.43
	06/01/2016	$32.44	$10.41	$10.08	$0.00	$52.93
	08/01/2016	$32.44	$10.91	$10.08	$0.00	$53.43
	12/01/2016	$32.44	$10.91	$10.89	$0.00	$54.24
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$32.23	$10.41	$9.33	$0.00	$51.97
	12/01/2015	$32.23	$10.41	$10.08	$0.00	$52.72
	06/01/2016	$32.73	$10.41	$10.08	$0.00	$53.22
	08/01/2016	$32.73	$10.91	$10.08	$0.00	$53.72
	12/01/2016	$32.73	$10.91	$10.89	$0.00	$54.53
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1*	10/01/2015	$54.83	$8.42	$15.65	$0.00	$78.90
	01/01/2016	$54.43	$8.67	$15.80	$0.00	$78.90
	03/01/2016	$55.43	$8.67	$15.80	$0.00	$79.90
	10/01/2016	$56.58	$8.67	$15.80	$0.00	$81.05
	03/01/2017	$57.58	$8.67	$15.80	$0.00	$82.05

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550 (Section A) Zone 1*

Effective Date - 10/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.19	$8.42	$8.40	$0.00	$36.01
2	40	$21.93	$8.42	$8.40	$0.00	$38.75
3	45	$24.67	$8.42	$8.40	$0.00	$41.49
4	50	$27.42	$8.42	$8.40	$0.00	$44.24
5	55	$30.16	$8.42	$8.40	$0.00	$46.98
6	60	$32.90	$8.42	$8.40	$0.00	$49.72
7	65	$35.64	$8.42	$8.40	$0.00	$52.46
8	70	$38.38	$8.42	$8.40	$0.00	$55.20
9	75	$41.12	$8.42	$8.40	$0.00	$57.94
10	80	$43.86	$8.42	$8.40	$0.00	$60.68

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.05	$8.67	$8.55	$0.00	$36.27
2	40	$21.77	$8.67	$8.55	$0.00	$38.99
3	45	$24.49	$8.67	$8.55	$0.00	$41.71
4	50	$27.22	$8.67	$8.55	$0.00	$44.44
5	55	$29.94	$8.67	$8.55	$0.00	$47.16
6	60	$32.66	$8.67	$8.55	$0.00	$49.88
7	65	$35.38	$8.67	$8.55	$0.00	$52.60
8	70	$38.10	$8.67	$8.55	$0.00	$55.32
9	75	$40.82	$8.67	$8.55	$0.00	$58.04
10	80	$43.54	$8.67	$8.55	$0.00	$60.76

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	09/01/2015	$34.25	$13.00	$14.06	$0.00	$61.31
	03/01/2016	$34.63	$13.00	$14.55	$0.00	$62.18

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.70	$13.00	$0.41	$0.00	$27.11
2	40	$13.70	$13.00	$0.41	$0.00	$27.11
3	45	$15.41	$13.00	$11.03	$0.00	$39.44
4	45	$15.41	$13.00	$11.03	$0.00	$39.44
5	50	$17.13	$13.00	$11.30	$0.00	$41.43
6	55	$18.84	$13.00	$11.58	$0.00	$43.42
7	60	$20.55	$13.00	$11.86	$0.00	$45.41
8	65	$22.26	$13.00	$12.13	$0.00	$47.39
9	70	$23.98	$13.00	$12.41	$0.00	$49.39
10	75	$25.69	$13.00	$12.68	$0.00	$51.37

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.85	$13.00	$0.42	$0.00	$27.27
2	40	$13.85	$13.00	$0.42	$0.00	$27.27
3	45	$15.58	$13.00	$11.52	$0.00	$40.10
4	45	$15.58	$13.00	$11.52	$0.00	$40.10
5	50	$17.32	$13.00	$11.79	$0.00	$42.11
6	55	$19.05	$13.00	$12.06	$0.00	$44.11
7	60	$20.78	$13.00	$12.34	$0.00	$46.12
8	65	$22.51	$13.00	$12.62	$0.00	$48.13
9	70	$24.24	$13.00	$12.90	$0.00	$50.14
10	75	$25.97	$13.00	$13.17	$0.00	$52.14

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2015	$48.80	$10.18	$18.57	$0.00	$77.55
	02/01/2016	$49.37	$10.18	$18.57	$0.00	$78.12
	08/01/2016	$50.27	$10.18	$18.65	$0.00	$79.10
	02/01/2017	$50.84	$10.18	$18.65	$0.00	$79.67

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.40	$10.18	$18.57	$0.00	$53.15
2	60	$29.28	$10.18	$18.57	$0.00	$58.03
3	70	$34.16	$10.18	$18.57	$0.00	$62.91
4	80	$39.04	$10.18	$18.57	$0.00	$67.79
5	90	$43.92	$10.18	$18.57	$0.00	$72.67

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.69	$10.18	$18.57	$0.00	$53.44
2	60	$29.62	$10.18	$18.57	$0.00	$58.37
3	70	$34.56	$10.18	$18.57	$0.00	$63.31
4	80	$39.50	$10.18	$18.57	$0.00	$68.25
5	90	$44.43	$10.18	$18.57	$0.00	$73.18

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$36.45	$7.30	$13.40	$0.00	$57.15
	12/01/2015	$37.20	$7.30	$13.40	$0.00	$57.90
	06/01/2016	$37.95	$7.30	$13.40	$0.00	$58.65
	12/01/2016	$38.95	$7.30	$13.40	$0.00	$59.65
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$35.17	$7.30	$13.40	$0.00	$55.87
	12/01/2015	$35.92	$7.30	$13.40	$0.00	$56.62
	06/01/2016	$36.67	$7.30	$13.40	$0.00	$57.37
	12/01/2016	$37.67	$7.30	$13.40	$0.00	$58.37
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$35.05	$7.30	$13.40	$0.00	$55.75
	12/01/2015	$35.80	$7.30	$13.40	$0.00	$56.50
	06/01/2016	$36.55	$7.30	$13.40	$0.00	$57.25
	12/01/2016	$37.55	$7.30	$13.40	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$32.52	$10.41	$9.33	$0.00	$52.26
	12/01/2015	$32.52	$10.41	$10.08	$0.00	$53.01
	06/01/2016	$33.02	$10.41	$10.08	$0.00	$53.51
	08/01/2016	$33.02	$10.91	$10.08	$0.00	$54.01
	12/01/2016	$33.02	$10.91	$10.89	$0.00	$54.82
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	06/01/2015	$47.33	$7.30	$13.80	$0.00	$68.43
	12/01/2015	$48.08	$7.30	$13.80	$0.00	$69.18
	06/01/2016	$48.83	$7.30	$13.80	$0.00	$69.93
	12/01/2016	$49.83	$7.30	$13.80	$0.00	$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	06/01/2015	$49.33	$7.30	$13.80	$0.00	$70.43
	12/01/2015	$50.08	$7.30	$13.80	$0.00	$71.18
	06/01/2016	$50.83	$7.30	$13.80	$0.00	$71.93
	12/01/2016	$51.83	$7.30	$13.80	$0.00	$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	06/01/2015	$39.40	$7.30	$13.80	$0.00	$60.50
	12/01/2015	$40.15	$7.30	$13.80	$0.00	$61.25
	06/01/2016	$40.90	$7.30	$13.80	$0.00	$62.00
	12/01/2016	$41.90	$7.30	$13.80	$0.00	$63.00
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2015	$41.40	$7.30	$13.80	$0.00	$62.50
	12/01/2015	$42.15	$7.30	$13.80	$0.00	$63.25
	06/01/2016	$42.90	$7.30	$13.80	$0.00	$64.00
	12/01/2016	$43.90	$7.30	$13.80	$0.00	$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	08/01/2015	$31.94	$10.41	$9.33	$0.00	$51.68
	12/01/2015	$31.94	$10.41	$10.08	$0.00	$52.43
	06/01/2016	$32.44	$10.41	$10.08	$0.00	$52.93
	08/01/2016	$32.44	$10.91	$10.08	$0.00	$53.43
	12/01/2016	$32.44	$10.91	$10.89	$0.00	$54.24
WAGON DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	09/01/2015	$50.46	$10.82	$15.14	$0.00	$76.42
	03/01/2016	$51.61	$10.82	$15.14	$0.00	$77.57
	09/01/2016	$52.66	$10.82	$15.14	$0.00	$78.62
	03/01/2017	$53.66	$10.82	$15.14	$0.00	$79.62
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$26.11	$7.25	$1.78	$0.00	$35.14
	08/28/2016	$26.61	$7.50	$1.80	$0.00	$35.91
	09/03/2017	$27.14	$7.75	$1.81	$0.00	$36.70
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$36.98	$7.25	$8.12	$0.00	$52.35
	08/28/2016	$37.70	$7.50	$8.87	$0.00	$54.07
	09/03/2017	$38.45	$7.75	$9.53	$0.00	$55.73
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$30.46	$7.25	$8.34	$0.00	$46.05
	08/28/2016	$31.05	$7.50	$8.89	$0.00	$47.44
	09/03/2017	$31.66	$7.75	$9.44	$0.00	$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$23.93	$7.25	$1.72	$0.00	$32.90
	08/28/2016	$24.39	$7.50	$1.73	$0.00	$33.62
	09/03/2017	$24.88	$7.75	$1.75	$0.00	$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$36.98	$7.25	$12.29	$0.00	$56.52
	08/28/2016	$37.70	$7.50	$12.95	$0.00	$58.15
	09/03/2017	$38.45	$7.75	$13.61	$0.00	$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$32.63	$7.25	$9.05	$0.00	$48.93
	08/28/2016	$33.26	$7.50	$9.63	$0.00	$50.39
	09/03/2017	$33.92	$7.75	$10.21	$0.00	$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$23.93	$7.25	$1.72	$0.00	$32.90
	08/28/2016	$24.39	$7.50	$1.73	$0.00	$33.62
	09/03/2017	$24.88	$7.75	$1.75	$0.00	$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$19.58	$7.25	$1.59	$0.00	$28.42
	08/28/2016	$19.96	$7.50	$1.60	$0.00	$29.06
	09/03/2017	$20.35	$7.75	$1.61	$0.00	$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2015	$43.51	$7.25	$15.06	$0.00	$65.82
	08/28/2016	$44.35	$7.50	$15.83	$0.00	$67.68
	09/03/2017	$45.23	$7.75	$16.61	$0.00	$69.59

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LINEMAN (Outside Electrical) - East Local 104*

Effective Date - 08/30/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.11	$7.25	$3.28	$0.00	$36.64
2	65	$28.28	$7.25	$3.35	$0.00	$38.88
3	70	$30.46	$7.25	$3.41	$0.00	$41.12
4	75	$32.63	$7.25	$4.98	$0.00	$44.86
5	80	$34.81	$7.25	$5.04	$0.00	$47.10
6	85	$36.98	$7.25	$5.11	$0.00	$49.34
7	90	$39.16	$7.25	$7.17	$0.00	$53.58

Effective Date - 08/28/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.61	$7.50	$3.30	$0.00	$37.41
2	65	$28.83	$7.50	$3.36	$0.00	$39.69
3	70	$31.05	$7.50	$3.43	$0.00	$41.98
4	75	$33.26	$7.50	$5.00	$0.00	$45.76
5	80	$35.48	$7.50	$5.06	$0.00	$48.04
6	85	$37.70	$7.50	$5.13	$0.00	$50.33
7	90	$39.92	$7.50	$7.20	$0.00	$54.62

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/01/2015	$28.12	$4.25	$3.09	$0.00	$35.46
	01/01/2016	$28.98	$4.25	$3.12	$0.00	$36.35
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/01/2015	$26.49	$4.25	$3.04	$0.00	$33.78
	01/01/2016	$27.31	$4.25	$3.07	$0.00	$34.63
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/01/2015	$26.49	$4.25	$3.04	$0.00	$33.78
	01/01/2016	$27.31	$4.25	$3.07	$0.00	$34.63
TREE TRIMMER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/01/2015	$18.05	$3.55	$0.00	$0.00	$21.60
	01/31/2016	$18.51	$3.55	$0.00	$0.00	$22.06

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.

TREE TRIMMER GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/01/2015	$15.92	$3.55	$0.00	$0.00	$19.47
	01/31/2016	$16.32	$3.55	$0.00	$0.00	$19.87

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

SCOPE OF WORK

The proposed project includes a hot mix asphalt (HMA) multi-use path that will formally link existing paved paths south of the Jamaicaway On/Off Ramps at Pond Avenue and north of the Riverway On/Off Ramps at River Road. The existing connection between the two paths consists of a worn dirt trail. The project will replace the dirt trail with an ADA compliant HMA path. The project will also provide a dedicated signalized crossing of Washington Street (Route 9) for path users. Construction activities will include the following:

- Paved HMA 11 to 12 foot wide ADA compliant multi-use recreational path.
- Geometric roadway improvements including realignment of Pond Avenue at Washington Street (Route 9), River Road at Brookline Avenue and the Jamaicaway On/Off Ramps at Pond Avenue, and removing the Riverway Off ramp at River Road.
- Paved HMA or cement concrete 5 to 8 feet wide ADA compliant sidewalks.
- Pedestrian actuated mid-block crossing of Washington Street (Route 9).
- Roadway pavement markings and signing at crossings.
- Striped bicycle accommodations along Washington Street (Route 9).
- Pavement mill and overlay of Pond Avenue, Washington Street (Route 9) and River Road.
- Installation of porous pavement along a section of River Road.
- Relocation of existing catch basins.
- Installation of leaching structures for infiltration. The Town will install three (3) leaching structures and one (1) DMH along Pond Avenue as noted on the Plans.
- Installation of stormwater treatment devices.
- Restore existing landscaping and add additional trees and shrubs. Any necessary tree removal or clearing and grubbing will be performed by the Town.
- New path and street lighting infrastructure. The Town will install the 3" diameter lighting conduit and hand holes along River Road from Washington Street (Route 9) to Brookline Avenue. The Contractor will install the lighting conduit, light bases and hand holes along Washington Street (Route 9) and Pond Avenue. Any existing lighting that is required to be removed will be done by the Town.
- Replace chain link fence between the Muddy River and the flood wall.

The work under this Contract includes, but is not limited to, excavation; full depth pavement construction; pavement milling; paving; constructing driveways, cement concrete sidewalks and wheelchair ramps; HMA multi-use paths; removing and resetting existing granite curb, and installing new curbing; drainage (including leaching structures); providing and spreading sandy loam and seed; flood plain mitigation; landscaping; trail amenities; traffic signal equipment installation, traffic signal interconnect, traffic signing and pavement markings, traffic control management, and other roadway improvements.

All work under this contract shall be done in conformance with the Massachusetts Highway Department *Standard Specifications for Highways and Bridges* dated 1988, the *Supplemental Specifications* dated June 15, 2012, and the *Interim Supplemental Specifications* contained in this book; the *2014 Construction Standard Details,* the *1990 Standard Drawings for Signs and Supports*; the *2009 Manual on Uniform Traffic Control Devices (MUTCD)* with *Massachusetts*

Amendments and the *Standard Municipal Traffic Code*; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; the latest edition of *American Standard for Nursery Stock*; the Plans and these Special Provisions.

The Contractor shall be responsible to obtain all necessary permits from the City of Boston as required.

SUBSECTION 8.02 SCHEDULE OF OPERATIONS (Replace this subsection with the following:)

It is anticipated the majority of the work will be completed during normal daytime working hours, from 7:00 AM to 3:30 PM, however some tasks will require nighttime, weekend or weekend night work in order to expedite construction and minimize weekday traffic delays. Such tasks include, but are not limited to, pavement reconstruction, milling and overlay. Saturday work hours would start at 8:00 AM.

The Contractor shall include additional costs associated with nighttime, weekend or weekend night work activities in his bid.

Route 9 Restrictions

Lane closures along Route 9 shall only occur between the hours of 9:00 AM and 3:00 PM and/or 10:00 PM and 5:00 AM.

Micro Staging Restrictions

Micro staging of the work on local roads may occur between the hours of 9:00 PM and 5:00 AM with the approval of the Engineer and the Town. This may result in single lane alternating traffic controlled by a police officer.

PROTECTION OF UNDERGROUND FACILITIES

The Contractor's attention is directed to the necessity of making his own investigation in order to assure that no damage to existing structures, drainage lines, traffic signal conduits, etcetera, will occur.

The Contractor shall notify Massachusetts DIG SAFE and procure a Dig Safe Number for each location prior to disturbing existing ground in any way. The telephone number of the Dig Safe Call Center is 811 or 1-888-344-7233.

HOLIDAY WORK RESTRICTIONS FOR CALENDAR YEAR 2016

(Supplementing Subsection 7.09)

The Town of Brookline may authorize work to continue during these specified time periods if it is determined by the Town that the work will not negatively impact the traveling public.

Below are the holiday work restrictions for the calendar year 2016.

Patriot's Day (State Holiday)
Monday, April 18, 2016:

Work restrictions will be in place along the entire Boston Marathon route and any other locations that the Town determines are warranted so as to not to impact the marathon.

Mother's Day
Sunday, May 8, 2016:

No work from noon on Friday, May 6, 2016 until the normal start of business on Monday, May 9, 2016.

Memorial Day (Federal Holiday)
Monday, May 30, 2016:

No work on major arterial roadways from noon on Friday, May 27, 2016 until the normal start of business on Tuesday, May 31, 2016.

Bunker Hill Day (Suffolk County State Holiday)
Friday, June 17, 2016:

No work restrictions due to traffic concerns.

Independence Day (Federal Holiday)
Monday, July 4, 2016:

No work on major arterial roadways from noon on Friday, July 1, 2016 until the normal start of business on Tuesday, July 5, 2016.

Labor Day (Federal Holiday)
Monday, September 5, 2016:

No work on major arterial roadways from noon on Friday, September 2, 2016 until the normal start of business on Tuesday, September 6, 2016.

Columbus Day (Federal Holiday)
Monday, October 10, 2016:

No work on major arterials from noon time on Friday, October 7, 2016 until the normal start of business on Tuesday, October 11, 2016. The Town may allow work in those areas on a case by case basis and where work is behind barrier and will not impact traffic.

Veterans' Day (Federal Holiday)
Friday, November 11, 2016:

No work restrictions due to traffic concerns.

Thanksgiving Day (Federal Holiday)
Thursday, November 24, 2016:

No work on major arterials from noon on Wednesday, November 23, 2016 until the normal start of business on the Monday, November 28, 2016.

Christmas Day (Federal Holiday)
Sunday, December 25, 2016:

No work on major arterial roadways from noon on Friday, December 23, 2016 until the normal start of business on Tuesday, December 27, 2016.

Jewish Holidays
Rosh Hashana - Monday-Tuesday, October 3 & 4, 2016
Yom Kippur - Wednesday, October 12, 2016
Sukkot – Monday-Tuesday, October 17 & 18, 2016
Shmini Atzeret – Monday, October 24, 2016
Simchat Torah – Tuesday, October 25, 2016
No work on major arterial roadways during the above days without approval from the Town.

NOTICE TO OWNERS OF UTILITIES
(Supplementing Subsection 7.13)

Written notice shall be given by the Contractor to all public service corporations or municipal and State officials owning or having charge of publicly or privately owned utilities of his intention to commence operations affecting such utilities at least one week in advance of the commencement of such operations. The Contractor shall, at the same time, file a copy of such notice with the Engineer. It is the Contractor's responsibility to provide adequate notice to all public and private utilities that may be affected by the construction of the project.

The following are the names of owners of the principal utilities affected as well as other major contacts, but completeness of this list is not guaranteed:

Electric
NSTAR Electric & Gas Company
d/b/a/ Eversource Energy
One NSTAR Way, NWBED180
Westwood, MA 02090
Contact: Steven Owens (508) 441-5881
Email: Steven.Owens@nu.com

Gas
National Grid Gas
40 Sylvan Road-3rd Floor-W3.244
Waltham, MA 02451
Contact: Melissa Owens (781) 907-2845 Email: Melissa.Owens@nationalgrid.com

Telephone
Verizon
385 Myles Standish Boulevard, Taunton, MA 02780
Contact: Karen Mealey (508) 828-6437 Email: karen.m.mealey@verizon.com

Water & Sewer
Brookline DPW – Water & Sewer
333 Washington Street
Brookline, MA 02445
Contact: Frederick Russell (617) 730-2170

MWRA
2 Griffin Way
Chelsea, MA 02150
Contact: Ralph Francesconi (617)305-5827(Water) Email: Ralph.Francesconi@mwra.state.ma.us
Contact: Kevin McKenna (617) 305-5956 (Sewer) Email: Kevin.McKenna@mwra.state.ma.us

NOTICE TO OWNERS OF UTILITIES (Continued)

Cable
RCN
173 Bedford Street
Lexington, MA 02420
Contact: Margot Jones (781) 652-8951

Comcast
PO Box 6505
Chelmsford, MA 01824
Contact: Wendy Brown (978) 848-5183 Email: Wendy_Brown@cable.comcast.com

Nstar Communications
One Nstar Way, NE 220
Westwood, MA 02090
Contact: Andrew Balta (781) 441-3492 Email: andrew.balta@eversource.com

DPW
Brookline Department of Public Works
333 Washington Street
Brookline, MA 02445
Contact: Peter Ditto (617) 730-2139

Fire Alarm
Brookline Fire Alarm
350 Washington Street
Brookline, MA 02445
Contact: Mark Jefferson (617) 730-2266

Other
186 Comm c/o Waveguide Inc.
10 North Southwood Drive
Nashua, NH 03063
Contact: Jay Dunn (603) 598-0096

Level (3) Communications
1025 Eldorado Boulevard
Broomfield, CO 80021
Contact: Nickey Worthington (720) 888-0336 Email:nickey.worthington@level3.com

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Contact: Brandon Woodard (724) 416-2537 Email: citymodifications@crowncastle.com

NOTICE TO OWNERS OF UTILITIES (Continued)

Brookline Conservation Commission
333 Washington Street
Brookline, MA 02445
Contact: Thomas Brady (617) 730-2088 Email: tbrady@brooklinema.gov

City of Boston Public Works Department & Transportation Department
1 City Hall Square
Room 715 and 721
Boston, MA 02201
Contact: Public Works Department (617) 635-4909

ARCHITECTURAL ACCESS BOARD TOLERANCES

The Contractor is hereby notified that they are ultimately responsible for constructing all project elements in strict compliance with the current AAB/ADA rules, regulations and standards.

All construction elements in this project associated with sidewalks, walkways, wheelchair ramps and curb cuts are controlled by 521CMR - Rules and Regulations of the Architectural Access Board (AAB).

The AAB Rules and Regulations specify maximum slopes and minimum dimensions required for construction acceptance. There is no tolerance allowed for slopes greater than the maximum slope nor for dimensions less than the minimum dimensions.

Contractors shall establish grade elevations at all wheel chair ramp locations, and shall set transition lengths according to the appropriate table in the Construction Standards (or to the details shown on the plans).

All wheelchair ramp joints and transition sections which define grade changes shall be formed, staked and checked prior to placing cement concrete. All grade changes are to be made at joints.

SAWCUTS

Saw cutting shall be considered incidental to the item to which it is associated. No separate payment will be made for saw cutting hot mix asphalt or cement concrete. Sawcutting locations shall be reviewed and approved in the field by the engineer prior to performing the work.

CONCURRENT WORK BY OTHERS WITHIN PROJECT LIMITS

(Supplementing Section 5.06)

Concurrent work may be in progress in the project area by MassDOT, the local municipality, utility companies, another contractor hired by the owner, or other contractors hired by private parties. The Contractor is required to coordinate his activities with these parties.

The Contractor is required to coordinate work with the local utilities to adjust, rebuild, reset and or relocate all private utilities required by the scope of work and as directed by the Engineer. No additional compensation or extension of time shall be granted due to any delays that may result from the failure to relocate utilities in a timely fashion.

PROSECUTION OF WORK

(Supplementing Subsection 8.03*)*

Before starting any work under this Contract, the Contractor shall prepare, and submit to the Engineer for approval, a plan (based on the Contract traffic management plans) that indicates the traffic and pedestrian routing proposed by the Contractor during the various stages and time periods of the work and the temporary barricades, signs, drums and other traffic control devices to be employed during each stage and time period of the work to maintain traffic and access to abutting properties.

Particular care shall be taken to establish and maintain methods and procedures that will not create unnecessary or unusual hazards to public safety. Traffic control devices required only during working hour operations shall be removed at the end of each working day. Signs having messages that are irrelevant to the proposed traffic conditions during each phase of operations shall be removed or properly covered at the end of each work period. Signs shall be kept clean at all times and legends shall be distinctive and unmarred.

PRESERVATION OF ROADSIDE GROWTH

(Supplementing Subsection 8.08)

The Contractor shall take all necessary care when excavating or working in the vicinity of existing trees so that the root systems, trunks, and branches are not damaged. All precautions shall be taken to insure that heavy equipment does not damage any roots, including those that lie below the limits of excavation.

Do not store equipment or stockpile materials within drip line of trees or in areas enclosed by tree protection fencing.

Avoid any direct soil contamination in root zone area by petroleum, petroleum products or solvents, salts or any other pollutant during construction.

All cutting or trimming of trees to be preserved shall be executed by a Massachusetts Certified Arborist. The Contractor shall provide the Engineer with a copy of the certification prior to any work on trees.

Existing plants adjacent to construction may be protected as a group using temporary fencing as specified under Item 102.52, or in the event of construction close to individual trees, using Individual Tree Protection as specified under Item 102.51.

Trees that, in the judgment of the Engineer, have been irreparably damaged by the Contractor shall be replaced in kind and in size, or, with a quantity of 2 inch caliper replacement trees (the quantity of which shall be determined by the Engineer) such that the cumulative caliper of the replacement trees will be up to the equivalent of diameter of the lost tree at breast height. Cost of replacement trees shall be paid by the Contractor.

Cost of removal of destroyed tree, including roots and stump, as well as the cost of replacement trees, shall be paid for by the Contractor.

DRAINAGE STRUCTURES

Where new pipe is shown on the drawings to be connected into an existing drainage structure to remain, the existing structure shall be carefully and neatly cut to provide the minimum size opening required for the insertion of the new pipe. The proposed pipe end shall be set or cut off flush with the inside face of the existing structure wall and the remaining space around the pipe completely filled with cement grout for the full thickness of the structure wall. Existing shaped inverts shall be reconstructed as necessary to provide a smooth and uniform flow channel from the new pipe through the existing structure.

At structures remaining in use connecting to abandoned or removed pipes shall be plugged at the structure wall.

When the drainage structure is removed and the pipe abandoned in place, plug pipe opening to prevent material from migrating into pipe.

All drainage structures to be abandoned or removed shall have the pipe openings plugged.

Where new structures shown on the plans are to connect to existing pipes to remain, test pits to locate and survey the existing pipe shall be performed prior to ordering structure. The existing pipe shall be carefully cut to allow the insertion of the drainage structure. The existing pipe end shall be cut off flush with the inside face of the proposed structure wall and the remaining space around the pipe completely filled with cement grout for the full thickness of the structure wall.

No separate payment will be made for the cost of connecting existing pipes to new structures, but all costs in connection therewith shall be included in the unit price bid for the various structure items. If new pipe or pipe section are required to extend the existing line to and through the new structure wall, the new pipe will be paid for under the unit price per foot established under that item.

No separate payment will be made for the cost of connecting new pipes into existing structures and necessary alterations of existing structures, but all costs in connection therewith shall be included in the unit prices bid for the various pipe items.

CASTINGS

All new water/sewer/drain castings required for the project will be provided by the Town of Brookline. Installation of castings shall be included in the various contract items and no additional compensation will be provided.

FINE GRADING AND COMPACTING

Fine grading and compacting of the subgrade, the grading and finishing of all slopes, and the preparation of all areas for topsoil or loam shall be constructed in accordance with the relevant provisions of Section 170. The cost of fine grading and compacting shall be included in the various contract items and no additional compensation will be provided.

STREET LIGHTING

All street lighting and conduits shall be installed by a licensed electrician. Cost of the electrician shall be included in the cost of the lighting items and will not be paid for separately.

SUPPLEMENTAL SPECIFICATIONS

ITEM 102.51	**INDIVIDUAL TREE PROTECTION**	**EACH**
ITEM 102.52	**TEMPORARY TREE PROTECTION FENCE**	**FOOT**

The work under these items shall conform to the relevant provisions of Sections 101, 644 and 771 and the following:

The purpose of these items is to prevent damage to branches, stems and root systems of existing individual trees as well as shrubs and other quality vegetation to remain, and to ensure their survival. To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 feet of the canopy of trees or where directed, the Contractor shall take the appropriate protective measures specified herein.

Individual Tree Protection, Item 102.51, shall be used when construction activities are likely to occur within the canopy of individual trees or where there may be any risk of damage to trees.

Temporary Tree Protection Fence, Item 102.52, shall be used to protect areas of existing trees or other areas of quality vegetation that is to remain.

The Contractor shall be solely responsible for judging the full extent of the work requirements, including, but not necessarily limited to any equipment and materials necessary for providing tree protection.

Incidental to the cost of these items, the Contractor shall retain the services of a certified arborist, who shall make recommendations as to the specific appropriate treatment of trees within or near the work zone.

Prior to any construction activities, the Contractor and Arborist shall walk the site with the Engineer and Town Tree Warden to identify which trees will require protection and to determine approved measures. The Arborist shall make recommendations as to appropriate methods to protect the trees. The Engineer will have final decision as to trees and methods.

The Contractor is responsible for the protection of all existing trees and plants within and immediately adjacent to the construction area that are not designated to be removed for the length of the construction period.

SUBMITTALS

Incidental to this item, the Contractor shall provide to the Engineer one (1) copy American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1: Pruning. These references shall be kept by the Engineer at his office for the length of the Contract.

Prior to start of work, the Contractor shall submit to the Engineer the name and certification number of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this Item shall be incidental to this item.

MATERIALS

Fence and temporary fence posts shall be subject to the approval of the Engineer.

Fencing for individual plants shall be polyethylene fencing or chain link fence (new or used).

Staking for individual tree protection fencing shall be steel posts or 2x4 lumber as directed and approved by the Engineer.

Wood chips shall conform to provisions of Wood Chip Mulch under Materials Section M6.04.3.

Trunk protection shall be black corrugated plastic pipe which has been cut in half. Pipe shall be at least 6 feet in length and installed 1' above the base of the trunk. The two plastic pipe half shall be strapped together around the trunk using 12mm galvanized strapping of galvanized 9 gauge wire. Alternative materials shall be at the approval of the Engineer. Alternative materials shall provide adequate protection from anticipated construction activities and shall not injure or scar trunk.

Temporary Tree Protection Fence shall be brightly colored polypropylene barricade or wooden snow fencing for tree protection or safety fencing as shown on the Contract drawings or as directed by the Engineer. Fencing shall be a minimum of 4 feet high and supported by steel or hardwood stakes spaced at a maximum of 8 feet on center or by other means acceptable to the Engineer. Fencing shall be materials and fastenings sufficient to provide sturdy and highly visible separation of the construction activates from the trees and existing plantings to be preserved

Incidental to these items, the Contractor shall provide water for maintaining plants in the construction area that will have exposed root systems for any period during construction.

CONSTRUCTION METHODS

To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 feet of the canopy of trees, the Contractor shall provide Individual Tree Protection as specified herein.

For individual tree protection, the Contractor shall set posts and fencing at the limits of the tree canopy. Where construction activities closer to the trees is unavoidable, the contractor shall tie branches out of the way and place wood chips to a depth of 6 inches on the ground to protect the root systems. The Contractor shall wrap the area of the trunk of the tree with burlap prior to armoring with corrugated plastic pipe. Corrugated pipe for tree trunks shall extend one foot from the base of the tree to at least 7 feet from the base.

To the extent possible, temporary landscaped fencing shall be installed at the limit of tree canopy and shall be staked and maintained vertical for the length of the contract.

Where excavation within canopy is unavoidable, the Contractor shall use equipment and methods that shall minimize damage to the tree roots, per recommendations of the Certified Arborist. Such methods may require root pruning prior to, as well as during, any excavation activities.

All fencing, trunk protection, branch protection, and woodchips shall be maintained throughout the duration of the contract. Protective fencing shall be repaired and woodchip mulch replaced as necessary during the duration of the contract at no additional cost.

Cutting and Pruning

Some pruning of roots and branches may be a necessary part of construction. Pruning will be performed on the same side of the tree that roots have been severed.

The Contractor shall retain the services of a Massachusetts State Certified Arborist to oversee any cutting of limbs, stem or roots of existing trees. All cuts shall be clean and executed with an approved tool. Under no circumstances shall excavation in the tree protection area be made with mechanical equipment that might damage the existing root systems.

Any tree root area exposed by construction shall be covered and watered immediately. Exposed tree roots shall be protected by dampened burlap at all times until they can be covered with soil.

Watering

Water each tree within the construction area where work is in progress twice per week until the surrounding soil of each tree is saturated for the duration of construction activities.

Removal of Protection

After all other construction activities are complete, but prior to final seeding, wood chips, temporary fencing, branch protection, and trunk protection materials shall be removed and disposed off site by the Contractor at no additional cost.

Tree Damage

The Contractor shall be held responsible for the health and survival of the existing trees in the immediate vicinity of the of the construction area. Damage that, in the Engineer's opinion, can be remedied by corrective measures shall be repaired immediately. Broken limbs shall be pruned according to industry standards. Wounds shall not be painted. Trees or shrubs that are damaged irreparably shall, at the Engineer's discretion, be replaced per the requirements of Division I of these Special Provisions. Cost of replacement trees shall be borne by the Contractor.

METHOD OF MEASUREMENT

Where the plans show specific, individual trees to remain and where grading or other disturbance is shown within the drip line of these trees or where the Engineer determines that an individual tree must be protected, these trees shall be protected and paid for under Item 102.51 Individual Tree Protection per each tree protected.

Temporary Tree Protection Fence will be measured for payment by the foot of fence installed, complete in place.

BASIS OF PAYMENT

Payment under these items shall be scheduled throughout the length of contract: 30 percent of value shall be paid upon installation, 30 percent approximately halfway through the contract, and the remainder to be paid at the end of the contract after completion of construction operations that would disturb plants and after the protection materials have been removed and properly disposed of off-site by the Contractor.

Compensation for Individual Tree Protection will be paid for at the contract unit price per each under Item 102.51. This item shall include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work, including the services of a certified arborist, water and fertilizer, and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

Where construction disturbance, such as grading activities, will occur within the limits of the canopy of groups of trees, these trees shall be protected and paid for under Item 102.52, Temporary Tree Protection Fence.

Temporary Tree Protection Fence will be paid for at the Contract unit price per foot. This item shall include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work, including the services of a certified arborist, water and fertilizer, and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

Cost of wood chips, as required, shall be incidental to these items.

ITEM 120.1 UNCLASSIFIED EXCAVATION CUBIC YARD

The work to be done under this Item shall conform to the relevant provisions of Section 120 of the Standard Specifications and the following:

The work includes the excavation within the floodplain compensatory storage mitigation area and the areas of full depth pavement construction for the new HMA multi-use path and new roadway alignments. All other excavation will be included in the cost of the various contract items.

The work shall also include the removal of existing sign foundations as called for on the plans. The foundation shall be removed to a depth of at least 24” below the existing ground and the

holes backfilled with gravel. The surface shall be patched with a material to match the existing ground or as directed by the Engineer.

No separate payment will be made for dismantling, loading, transporting and discarding of the supports as designated above, the excavation and disposal of the existing foundation and the supplying and placing of compacted gravel backfill where foundations and posts are removed, and the patching of the existing surface, but all costs in connection therewith shall be included in the Contract unit price bid.

Unclassified Excavation will be measured by the cubic yard measured in place by the Engineer prior to excavation.

ITEM 121.1 CLASS A ROCK EXCAVATION CUBIC YARD

Subsurface investigation has revealed that a 7"± concrete slab is present under the Route 9 roadway pavement. Class A Rock Excavation shall include the removal the concrete slab when encountered within the limits of roadway and/or concrete sidewalk excavation unless otherwise provided for in the Proposal. It is anticipated that the concrete slab removal will be required as part of the work within the Route 9 footprint including the conduit installation as well as granite curb installation.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Class A Rock Excavation will be measured by the cubic yard measured in place by the Engineer prior to excavation. Payment shall include saw cutting, removal, breaking and disposal of excavated material.

ITEM 129.1 BITUMINOUS CONCRETE EXCAVATION SQUARE YARD

The present Bituminous Concrete roadway and/or Bituminous Concrete sidewalk surface where shown on the plans or as directed by the Engineer, shall be broken up, excavated to the proposed lines and grades, and the excavated material removed from the site to a Contractor furnished disposal area.

CONSTRUCTION METHODS

Under the classification of Bituminous Concrete Excavation, the Contractor shall cut, break up, and remove the broken up material from off the site to a Contractor furnished disposal area. The edges of all excavated areas shall be cut on straight lines with vertical faces of sufficient depth to afford a butt joint of a minimum depth of one (1) inch wearing surface, or to a deeper depth if so directed by the Engineer. The cutting of all edges shall be by means of a power saw or as by such means as the Engineer shall direct. The excavated area shall then be reshaped and thoroughly compacted to the lines and grades as shown on the plans or as directed by the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Where the existing roadway and sidewalk pavement is cut, broken up and excavated, the excavated material removed, and the subgrade reshaped and compacted the Bituminous Concrete Excavated area will be measured in square yards.

All cutting, breaking up, excavation, removal of excavated material, reshaping and the compaction of subgrade will be paid for at the contract unit price per square yard of Bituminous Concrete excavation, which price shall include full compensation for all labor and equipment necessary to complete the work in a satisfactory manner.

ITEM 150.2 EXCAVATION STOCKPILED AND RESPREAD CUBIC YARD

The work to be done under this Item shall conform to the relevant provisions of Section 150 of the Standard Specifications and the following:

It is anticipated that excavation from locations within the project limits will be suitable for fill for other locations on the project. The Engineer shall approve the excavated materials for reuse on the project. The Contractor shall attempt to stockpile suitable materials to the extent possible in order to avoid having to bring new materials to the site. The contractor shall provide the necessary perimeter erosion control measures for stockpiled materials.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Excavation Stockpiled and Respread will be measured by the cubic yard and measured by the Engineer. All transport and placing of fill material will be paid for at the contract unit price per cubic yard of Excavation Stockpiled and Respread, which price shall include full compensation for all labor and equipment necessary to complete the work in a satisfactory manner.

ITEM 201.	**CATCH BASIN**	**EACH**
ITEM 202.	**MANHOLE**	**EACH**
ITEM 204.	**GUTTER INLET**	**EACH**
ITEM 205.	**LEACHING BASIN**	**EACH**

The work under these items shall conform to the relevant provisions of Section 201 of the Standard Specifications and the following:

All structures shall be precast.

All castings located within the pavement area shall not be set to finished grade until after the binder course has been placed.

All catch basins, manholes and gutter inlets shall be placed on a bedding of 6 inches crushed stone if necessary to stabilize foundations in accordance with subsection 150.68. Excavation and crushed stone shall be included in the cost of the structure.

All leaching basins shall be constructed as shown on the plans. Excavation and all required crushed stone shall be included in the cost of the structure.

Where required, cone sections of manholes and catch basins shall be replaced by flat top sections or eccentric sections at no additional cost.

All frames shall be set in a concrete collar conforming to MassDOT Construction Standard Detail E 202.9.0 prior to placement of top course. All frames shall be set on a minimum of two courses of mortared brick or precast grade rings as specified in the Standard Specifications. Cost of such work shall be included in the cost of the structure or item of which it forms a part.

Where new catch basins or manholes are shown on the drawings to be constructed over existing pipes, the work shall also include the connecting of the pipe to the structures and the necessary cutting and removal of the existing pipe within the structures. The existing pipe shall be neatly cut to provide a smooth uniform face flush with the inside wall surface of the structure and totally removed or neatly cut longitudinally and partially removed to retain the lower half of the existing pipe barrel to form the required (manhole) shaped invert.

Manholes and catch basins shall be measured as a unit regardless of required depth.

All proposed catch basins shall be constructed with a minimum 4-foot sump. No additional compensation will be allowed for deep sumps.

A gutter inlet may be used as necessary as a substitute for, or in addition to, a catch basin and at the direction of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Catch basins, manholes, leaching basins and gutter inlets will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work including the placing of castings furnished by the Town. No separate payment will be made for excavation regardless of depth and concrete collars/brick/mortar, but all costs in connection therewith shall be included in the Contract unit price bid.

No separate payment will be made for crushed stone for drainage structures foundations or 1½" crushed stone for leaching basins, but all costs in connection therewith shall be included in the Contract unit price bid.

No separate payment will be made for geotextile fabric, but all costs in connection therewith shall be included in the Contract unit price bid.

No separate payment will be made for sawcutting pavement, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 202.1 **STORMCEPTOR** **EACH**

The work under this item shall conform to the relevant provisions of Section 201 of the Standard Specifications and the following:

DESCRIPTION

The stornceptor structure shall separate dirt, grit, oil, etc. prior to discharge into the Muddy River. The stormwater treatment structure shall be a Stormceptor proprietary device model STC 450i or approved equal.

The Contractor shall provide shop drawings for review and approval.

BASIS OF PAYMENT

Stormceptor will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for excavation, crushed stone, transportation, frame and cover or interior works, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 220.1	**SANITARY AND DRAINAGE STRUCTURE ADJUSTED, E.C.C.**	**EACH**
ITEM 220.21	**DRAINAGE STRUCTURE REBUILT, E.C.C.**	**FOOT**
ITEM 220.52	**DRAINAGE STRUCTURE REMODELED, E.C.C.**	**EACH**

The work under this item shall conform to the relevant provisions of Section 201 of the Standard Specifications and the following:

DESCRIPTION

This work shall consist of removing, replacing and adjusting the masonry and castings of present structures, as required, to conform to newly proposed line and grade changes; to change type of structure, or changes in type of castings; to remodel or adjust drainage structure basins, all in accordance with this specification and in close conformity with the line and grades shown on the plan or established by the Engineer.

CONSTRUCTION METHODS

Prior to "Micromilling" the castings may be removed, a steel plate shall be placed on the existing masonry structure and bituminous concrete binder (pneumatically compacted) shall be placed to the existing pavement grade. If the castings are not removed and plated, then they shall be ramped with Hot Mix Asphalt immediately after the “Cold-Planing” process.

After Cold-Planning and after placing the binder course, the steel plate shall be removed, the masonry replaced and the casting set to conform to the newly proposed line and grade.

Hot Mix Asphalt (binder), thoroughly compacted, shall be placed around all castings adjusted as shown on the plan or as directed by the Engineer. Compensation for each payment item shall include payment for the HMA binder used in backfilling.

The Contractor will be held responsible for keeping all catch basins, manholes, and sewer and drain pipes within the work site free from all construction debris. Prior to placing the Bituminous Concrete Wearing Surface, the portion of completed work shall be thoroughly cleaned and the open ends of any pipe or structure securely blocked or stoppered in such a manner as to prevent the entrance into the pipe or structure of any dirt, rubbish or other foreign matter. No structure shall be accepted until it has been thoroughly inspected by the Engineer and found to comply with the above-specified requirements. Should the Town's Public Works Department have to remove any construction debris from catch basins, manholes, or sewer and drain pipes, the Contractor will be charged for these Town services.

The present castings shall be carefully removed. They shall be satisfactorily stored until they are required for use or until they are transported and stacked by the Contractor at the Water and Sewer Division Storage Yard, 815 Newton St.,(Transfer Station). If new castings are needed, they may be picked up at the same yard.

BASIS OF PAYMENT

The cost of removing, transporting, stacking and picking up and loading new castings by the Contractor shall be included in the contract unit price under the respective payment item for

catch basins, and manholes adjusted and change in type, excluding cost of castings (E.C.C.), and Drainage Structure remodeled. New castings will be furnished and delivered to the Site by the Town Water and Sewer Division. Adjustment of Sanitary and Drainage Structures shall include replacing broken and substandard castings with new castings furnished by the Town of Brookline.

The cost of plating and back filling with gravel and bituminous concrete binder shall be included in the contract unit price under the respective payment item. HMA for backfilling adjusted, new, and removed and reset structures shall be included within each respective payment item.

Drainage Structure remodeled will be paid for at the contract unit price each for Drainage Structure Remodeled. The price will constitute full compensation for the excavation of all materials encountered (except rock;) removal and disposal of the granite top and cover casting at a Contractor furnished disposal area; the removal of existing masonry as directed by the Engineer; the construction of new masonry; setting Town furnished castings including all labor and equipment required.

Sanitary and Drainage Structure adjusted will be paid for at the contract unit price each for structure adjusted, including removing the granite top, removing and replacing up to two (2) vertical feet of masonry, and resetting the granite top to the lines and grades specified. Also included in this unit price is all bituminous concrete collars; all backfilling and compaction; all tools, labor, materials, steel rails if required, equipment and incidental work necessary to complete the work as specified.

ITEM 220.6 SANITARY STRUCTURE REBUILT FEET

The work under these items shall conform to the relevant provisions of Section 220 of the Standard Specifications and the following:

DESCRIPTION

The work shall include all necessary saw-cutting and excavation of the existing pavement, cement concrete collars and earth material to obtain access to the masonry and removal of the casting. It shall also involve necessary backfill and compaction and hot mix asphalt of the excavated area.

Backfilling shall consist of suitable material thoroughly compacted with mechanical devices. Any structure that is in the paved roadway, and is not to the point of being backfilled and the collar installed at the end of any work day, shall be steel-plated or backfilled with compacted gravel, level with the roadway. Cost for the gravel and the re-excavation of the gravel to complete the work shall be included in the cost of the structure or item of which it forms a part.

Excavated holes shall be cut in the pavement in a neat manner with an approximate vertical face.

All frames and other castings shall be set in a concrete collar conforming to MassDOT Construction Standard Detail E 202.9.0 prior to placement of top course. The concrete collar shall be composed of 4000 PSI, 1 1/2 Inch. 565 High Early Strength Concrete. All frames shall

be set on a minimum of two courses of mortared brick. The concrete collar shall be constructed to allow the full depth of the top course of hot mix asphalt to be placed. The collar shall be completely coated with (RS-1) Asphaltic Emulsion before placement of hot mix asphalt. Cost of all such work shall be included in the cost of the structure or item of which it forms a part.

Debris, excess mortar or other materials shall be removed from the structures. All excess excavated materials and construction debris shall be removed and disposed of off the site.

The brick for sanitary structures shall be sound, hard and uniformly burned brick, regular and uniform in shape and size, of compact texture and satisfactory to the Engineer. Brick shall comply with ASTM Standard Specifications for sewer brick (made from clay or shale), Designation C-32-63 or Grade SA, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight. Rejected brick shall be immediately removed from the work and substituted with approved brick.

BASIS OF PAYMENT

Sanitary structure rebuilt will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 220.8 SANITARY STRUCTURE REMODELED EACH

The work under these items shall conform to the relevant provisions of Section 220 of the Standard Specifications and the following:

DESCRIPTION

The work shall include all necessary saw-cutting and excavation of the existing pavement, cement concrete collars and earth material to obtain access to the masonry and removal of the casting. It shall also involve necessary backfill and compaction and hot mix asphalt of the excavated area.

Backfilling shall consist of suitable material thoroughly compacted with mechanical devices. Any structure that is in the paved roadway, and is not to the point of being backfilled and the collar installed at the end of any work day, shall be steel-plated or backfilled with compacted gravel, level with the roadway. Cost for the gravel and the re-excavation of the gravel to complete the work shall be included in the cost of the structure or item of which it forms a part.

Excavated holes shall be cut in the pavement in a neat manner with an approximate vertical face.

Debris, excess mortar or other materials shall be removed from the structures. All excess excavated materials and construction debris shall be removed and disposed of off the site.

The brick for sanitary structures shall be sound, hard and uniformly burned brick, regular and uniform in shape and size, of compact texture and satisfactory to the Engineer. Brick shall comply with ASTM Standard Specifications for sewer brick (made from clay or shale), Designation C-32-63 or Grade SA, hard brick, except that the mean of five tests for absorption

shall not exceed 8 percent by weight. Rejected brick shall be immediately removed from the work and substituted with approved brick.

METHOD OF MEASUREMENT

Sanitary structure remodeled will be measured for payment by each, when the adjustment of structures to line or grade or both line and grade is greater than 6 inches, complete in place.

BASIS OF PAYMENT

Sanitary structure remodeled will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for removing and resetting frame and covers, by-pass pumping, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 223.1 FRAME AND GRATE (OR COVER) REMOVED AND STACKED EACH

The work under this item shall conform to the relevant provisions of Section 220 of the Standard Specifications and the following:

DESCRIPTION

The work shall consist of removing and stacking existing frames and grates (or covers) not required for reuse on this project. The Contractor shall stack frames and grates (or covers) at the Water and Sewer Division Storage Yard, 815 Newton St.,(Transfer Station). If said items are rejected by the Town, they shall become the property of the Contractor and shall be removed from the project and disposed of legally.

METHOD OF MEASUREMENT

Frame and grate (or cover) removed and stacked will be measured for payment by the each, complete in place.

BASIS OF PAYMENT

Frame and grate (or cover) removed and stacked will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 224.12 **12 INCH HOOD** **EACH**

The work under these items shall conform to the relevant provisions of Section 220 of the Standard Specifications and the following:

Hoods shall be used on all outlet pipes from catch basins. Hoods shall be manufactured by East Jordan Iron Works, catalog No. L202-000.

ITEM 256.1 **6 INCH SDR 35 PIPE** **FOOT**
ITEM 256.2 **12 INCH SDR 35 PIPE** **FOOT**

The work under this item shall conform to the relevant provisions of Section 230 of the Standard Specifications and the following:

DESCRIPTION

As noted on the plans, SDR 35 pipe refers to Polyvinylchloride (PVC) Pipe SDR 35.

METHOD OF MEASUREMENT

Pipes shall be measured in place and the quantity to be paid for shall be the length actually constructed within the specified limits.

BASIS OF PAYMENT

Pipe will be paid for at the contract unit price per linear foot of the kind of pipe required (including all required connections), which shall include furnishing and installing complete in place, and restoration of surface. Dense graded crushed stone for sub-base and surface restoration to original conditions shall be included in the various items of pipe.

No payment for trench excavation for pipes will be made within the limits of one foot outside the base section of catch basins, manholes, or leaching basins.

Backfill for pipe drain trenches shall be included in the various items of pipe.

No separate payment will be made for crushed stone for pipe bedding material, but all costs in connection therewith shall be included in the Contract unit price bid.

All pipe connections including, but not limited to, wyes, bends, couplings, bushings and cleanouts shall be included in the appropriate SDR pipe item. The Contract unit price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 415. PAVEMENT MICROMILLING SQUARE YARD

The work under this item shall conform to the same requirements for Section 130 Pavement Milling within Section 450.

DESCRIPTION

415.20 General.

This work shall consist of micromilling and removal of existing Hot Mix Asphalt (HMA) pavement courses from the project by the Contractor. Micromilling shall be performed in conformity with the approved QC Plan. The Contractor shall present and discuss in sufficient detail the Quality Control information and activities related to milling at the Construction Quality Meeting required under Section 450. Unless otherwise specified, the milled material shall become the property of the Contractor.

CONSTRUCTION METHODS

415.60 General.

All construction procedures under Pavement Micromilling shall also conform to any of the following relevant provisions of Pavement Milling:

Milling Equipment Requirements.

The milling equipment shall be self-propelled with sufficient power, traction, and stability to remove the existing HMA pavement to the specified depth and cross-slope. The milling machine shall be capable of operating at a minimum speed of 10 feet per minute, designed so that the operator can at all times observe the milling operation without leaving the control area of the machine, and equipped with the following:

a) A built in automatic grade control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results.

b) Longitudinal controls capable of operating from any longitudinal grade reference, including string line, 30 foot ski minimum, 30 foot mobile string line minimum, or a matching shoe.

c) The transverse controls shall have an automatic system for controlling cross-slope at a given rate.

d) Cutting heads able to provide a minimum 6 foot cutting width and a 0 to 4 inch deep cut in one pass. The teeth on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

e) An integral pickup and conveying device to immediately remove milled material from the roadway and discharge the millings into a truck, all in one operation.

f) All necessary safety devices such as reflectors, headlights, taillights, flashing lights and back up signals so as to operate safely in both day and night.

g) A means of effectively limiting the amount of dust escaping from the milling and removal operation in accordance with local, State, and Federal air pollution control laws and regulations.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a smaller or lesser-equipped milling machine may be permitted when approved by the Engineer.

Sweeper Equipment Requirements.

The Contractor shall provide a sufficient number of mechanical sweepers to ensure that the milled surface is free of millings and debris at the end of each day's milling operations. Each sweeper shall be equipped with a water tank, spray assembly to control dust, a pick-up broom, a dual gutter broom, and a dirt hopper. The sweepers shall be capable of removing millings and loose debris from the textured pavement.

Milling Operations.

The milling operations shall be scheduled to minimize the duration and placement of traffic on the milled surface. The milling operations shall not proceed more than 3 miles ahead of the paving operations. Under no circumstances shall the milled surface be left exposed to traffic for a period exceeding seven days. The Engineer may allow the Contractor to adjust the above limitations on milling production when necessary.

The Contractor shall coordinate milling and paving operations to minimize the exposure of milled surfaces to traffic. The Contractor shall ensure that milled surfaces are overlaid in a timely manner to avoid damage to the pavement structure. Any damage to the pavement structure resulting from extended exposure of the milled surface to traffic shall be repaired as directed by the Engineer at the Contractor's expense.

The existing pavement shall be removed to the average depth shown on the plans, in a manner that will restore the pavement surface to a uniform cross-section and longitudinal profile. The longitudinal profile of the milled surface shall be established using a 30 foot mobile ski, mobile string line, or stationary string line. The cross-slope of the milled surface shall be established by a second sensing device or by an automatic cross-slope control mechanism. The Contractor will be responsible for providing all grades necessary to remove the material to the proper line, grade, cross section, superelevation, and transitions shown on the plans or as directed by the Engineer. The requirement for automatic grade or slope controls may be waived by the Engineer in locations warranted by the situation, including intersections and closely confined areas.

The Engineer may adjust the average milling depth specified on the plans by ± 3/4" during each milling pass at no additional payment to minimize delamination of the underlying pavement course or to otherwise provide a more stable surface. If delamination or exposure of concrete occurs when milling a HMA pavement course from an underlying Portland Cement Concrete

(PCC) pavement, the Contractor shall cease milling operations and consult the Engineer to determine whether to reduce the milling depth or make other adjustments to the operation.

Protection of Inlets and Utilities.

Throughout the milling operation, protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense. To prevent the infiltration of milled material into the storm sewer system the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that falls into inlet openings or inlet grates shall be removed at the Contractor's expense.

Vertical Faces.

All permanent limits of the milled area shall be sawcut or otherwise neatly cut by mechanical means to provide a clean and sound vertical face. No vertical faces, transverse or longitudinal, shall be left exposed to traffic. If any vertical face is formed in an area exposed to traffic a temporary paved transition with a maximum 12:1 slope shall be established. If the milling machine is used to temporarily transition the milled pavement surface to the existing pavement surface, the temporary transition shall be constructed at a maximum 12:1 slope.

Opening to Traffic.

Prior to opening a milled area to traffic, the milled surface shall be thoroughly swept with a mechanical sweeper to remove all remaining millings and dust. This operation shall be conducted in a manner so as to minimize the potential for creation of a traffic hazard and to comply with local, State, and Federal air pollution control laws and regulations. Any damage to vehicular traffic as a result of milled material becoming airborne is the responsibility of the Contractor and shall be repaired at the Contractor's expense. Temporary pavement markings shall be placed in accordance with the provisions of Subsection 850.64.

Milled Surface Inspection.

The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, excessive longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, non-uniform milling teeth, improper use of equipment, or otherwise poor workmanship. Any unsatisfactory surfaces produced shall be corrected by remilling at the Contractor's expense and to the satisfaction of the Engineer.

The Contractor shall perform Quality Control inspection of all work items addressed as specified in the table below. Inspection activities during milling of HMA pavement may be performed by qualified Production personnel (e.g. Skilled Laborers, Foremen, Superintendents). However, the Contractor's QC personnel shall have overall responsibility for QC inspection. The Contractor shall not rely on the results of Department Acceptance inspection for Quality Control purposes. The Engineer shall be provided the opportunity to monitor and witness all QC inspection.

The milled surface of each travel lane shall be divided into longitudinal Sublots of 500 feet. The Contractor shall perform a minimum of one random QC measurement within each Sublot with a 10 foot straightedge in the transverse direction across the milled surface. Additional selective QC measurements within each Sublot will be performed as deemed necessary by the QC personnel. All QC inspection results shall be recorded on NETTCP Inspection Report Forms. The Engineer will also randomly inspect a minimum of 25% of the Sublots. The Contractor shall perform surface texture measurements with a 10 foot straightedge in the transverse direction across the milled surface. The milled surface shall have a texture such that the variation from the edge of the straightedge to the top of ridges between any two ridge contact points shall not exceed 1/8 inch. The difference in height from the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed 1/16". Any point in the surface not meeting these requirements shall be corrected as directed by the Engineer at the Contractor's expense.
In isolated areas where surface delamination between existing HMA layers or a surface delamination of HMA on Portland Cement Concrete causes a non-uniform texture to occur, the straightedge surface measurement requirements stated in the preceding paragraph may be waived, subject to the approval of the Engineer.

Minimum QC Inspection of Milling Operations

Inspection Component	Items Inspected	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Equipment	As specified in QC Plan	Per QC Plan	Per QC Plan	Per QC Plan
Environmental Conditions	Protection of Inlets & Utilities	Per QC Plan	Existing Surface	Visual Check
	Removal of Millings & Dust	Per QC Plan	Milled Surface	Visual Check
Workmanship	Milling Depth	Per QC Plan	Milled Surface	Check Measurement
	Cross-Slope & Profile	Per QC Plan	Milled Surface	Check Measurement
	Milled Surface Texture	Per QC Plan	Milled Surface	Visual Check
	Milled Surface Roughness	Once per 500 feet per milled lane	Milled Surface per Subsection 410.67	10 foot standard straightedge
	Sawcut Limit Vertical Face	Per QC Plan	Sawcut Limits	Visual Check

415.61 Micromilling Equipment Requirements.

The micromilling machine shall be equipped with a drum specifically designed to provide the surface specified below.

415.62 Control Strip.

The Contractor shall micromill a control strip. The control strip shall be 500 feet minimum in length with a uniformly textured surface and cross slope, as approved by the Engineer.

The micromilled surface of the control strip shall provide a satisfactory riding surface with a uniform textured appearance. The micromilled surface shall be free from gouges, excessive longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, non-uniform milling teeth, improper use of equipment, or otherwise poor workmanship. Any unsatisfactory surfaces produced in the control strip shall be corrected by additional micromilling at the Contractor's expense and to the satisfaction of the Engineer.

The micromilled pavement surface shall have a transverse pattern of 0.2 – 0.3 inch center to center of each strike area. The Contractor shall perform surface texture measurements with a 10 foot straightedge in the transverse direction across the milled surface. The milled surface shall have a texture such that the variation from the edge of the straightedge to the top of ridges between any two ridge contact points shall not exceed 1/8 inch. The difference in height from the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed 1/16". Any point in the surface not meeting these requirements shall be corrected as directed by the Engineer at the Contractor's expense.

415.67 Micromilled Surface Inspection.

The Contractor shall perform Quality Control inspection of all work items addressed under Section 415. The Contractor shall not rely on the results of Department Acceptance inspection for Quality Control purposes.

The micromilled surface shall meet the requirements of 415.62.

METHOD OF MEASUREMENT

Pavement micromilling will be measured for payment by the number of square yards of area from which the milling of existing HMA pavement has been completed and the work accepted. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar utility structures.

BASIS OF PAYMENT

Pavement micromilling, removal and disposal of existing HMA pavement will be paid for at the contract unit price per square yard. This price shall include all equipment, tools, labor, and materials incidental thereto. No additional payments will be made for multiple passes with the milling machine to remove the existing HMA surface to the grade specified.

No separate payments will be made for: performing handwork removal of existing pavement and providing protection around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractor's negligence; providing protection to underground utilities from the vibration of the milling operation; sawcutting micromilled limits; installing and removing any temporary transition; removing and disposing of millings; furnishing a sweeper and sweeping after milling. The costs for these items shall be included in the contract unit price for Pay Item 415. Pavement Micromilling.

Asphalt for patching will be paid for under other respective item of work.

SECTION 460.50

POROUS ASPHALT PAVEMENT

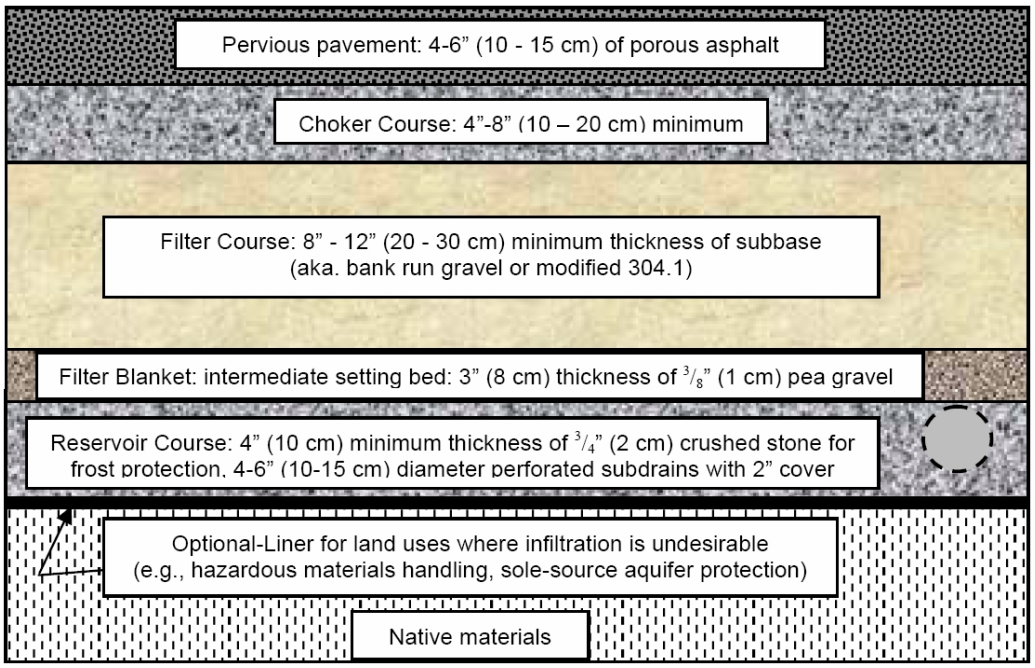
DESCRIPTION

460.50 General

This specification is intended to be used for porous asphalt pavement applications. The work of this Section includes subgrade preparation, installation of the underlying porous media beds, and porous asphalt mix (mix) design, production, and installation. Porous media beds refer to the material layers underlying the porous asphalt pavement. Porous asphalt pavement refers to the compacted mix of modified asphalt, aggregate, and additives.

Porous asphalt, Open graded friction course, or dense-mixed asphalt shall not be placed between November 15 and March 15, or when the ambient air temperature at the pavement site in the shade away from artificial heat is below 16 °C (60 °F) or when the actual ground temperature is below 10 °C (50 °F). Only the Engineer may adjust the air temperature requirement or extend the dates of the pavement season. The Contractor shall not pave on days when rain is forecast for the day, unless a change in the weather results in favorable conditions as determined by the Engineer.

Codes and Standards - All materials, methods of construction and workmanship shall conform to applicable requirements of AASHTO ASTM Standards, NHDOT Standard Specifications for Road and Bridge Construction, latest revised (including supplements and updates), or other standards as specified.



460.501 Submittals

The contractor must submit,
A list of materials proposed for work under this Section including the name and address of the materials producers and the locations from which the materials are to be obtained.

Certificates, signed by the materials producers and the relevant subcontractors, stating that materials meet or exceed the specified requirements, for review and approval by the Engineer.

Samples of materials for review and approval by the Engineer. For mix materials, samples may be submitted only to the QA inspector with the Engineer's approval.

Submittal Requirements

Material or Pavement Course*	Properties to be reported on Certificate**
choker course, reservoir course	gradation, max. wash loss, min. durability index, max. abrasion loss, air voids (reservoir course)
filter course	gradation, permeability/ sat. hydraulic conductivity
filter blanket	gradation
geotextile filter fabric	manufacturer's certification, AOS/EOS, tensile strength
striping paint	certificate
binder	PGAB certification
coarse aggregate	gradation, wear, fracture faces (fractured and elongated)
fine aggregate	gradation,
silicone	manufacturer's certification
Fibers (optional)	manufacturer's certification
mineral filler (optional)	manufacturer's certification
fatty amines (optional anti-strip)	manufacturer's certification
hydrated lime (optional anti-strip)	manufacturer's certification

* Samples of each material shall be submitted to the Engineer (or QA inspector for mix). These samples must be in sufficient volume to perform the standardized tests for each material.
** At a minimum, more material properties may be required (refer to Materials Section).

460.502 Materials

A) Porous Media Infiltration Beds

Below the porous asphalt itself are located the porous media infiltration beds (Figure 1), from top to bottom: a 4" – 8 "(10 - 20 cm) (minimum) thick layer of choker course of crushed stone (8" is preferable to alleviate compaction issues with the porous asphalt); an 8" to 12" (20 cm to 30 cm) minimum thickness layer of filter course of poorly graded sand (a.k.a. bankrun gravel or modified 304.1); 3" (8 cm) minimum thickness filter blanket that is an intermediate setting bed (pea gravel); and a reservoir course of crushed stone, thickness dependant on required storage and underlying native materials. Alternatively, the pea gravel layer could be thickened and used as the reservoir course depending upon subsoil suitability. This alternative simplifies subbase construction. For lower permeability native soils, perforated or slotted drain pipe is located in the stone reservoir course for drainage. This drain pipe can be daylighted to receiving waters or connected into other stormwater management infrastructure (wetland, storm sewer, etc.). The fine gradation of the filter course is for enhanced filtration and delayed infiltration. The high air void content of the uniformly graded crushed stone reservoir course: maximizes storage of infiltrated water thereby allowing more time for water to infiltrate between storms; and creates a capillary barrier that arrests vertical water movement and indoing so prevents winter freeze-thaw and heaving. The filter blanket is placed to prevent downward migration of filter course material into the reservoir course. The optional underdrain in the reservoir course is for hydraulic relief (typically raised off of the bottom of the reservoir stone layer for enhanced groundwater recharge). Nonwoven geotextile filter fabric (geotextile) is used only for stabilizing the sloping sides of the porous asphalt system excavation and not to be used on the bottom of the system unless needed for structural reasons.

1. Choker Course

Material for the choker course and reservoir course shall meet the following:

Maximum Wash Loss of 0.5%

Minimum Durability Index of 35

Maximum Abrasion Loss of 10% for 100 revolutions, and maximum of 50% for 500 revolutions.

Material for the choker course and reservoir course shall have the AASHTO No. 57 and AASHTO No. 3 gradations, respectively, as specified in **Table 1**. If the AASHTO No. 3 gradation cannot be met, AASHTO No. 5 is acceptable with approval of the Engineer. AASHTO no. 3 is also suitable for the choker course.

2. Filter course material

Filter course material shall have a hydraulic conductivity (also referred to as coefficient of permeability) of 10 to 60 ft/day at 95% standard proctor compaction unless otherwise approved by the Engineer. Great care needs to be used to not over compact materials. Overcompaction results with loss of infiltration capacity. The filter course material is commonly referred to as a bankrun gravel (modified NHDOT 304.1). In order to select an appropriate gradation, coefficient of permeability may be estimated through an equation that relates gradation to permeability, such

as described in *Correlations of Permeability and Grain Size* (Shepherd, 1989) or in *Section 8.7 Estimation of Saturated Hydraulic Conductivity* (Freeze and Cherry, 1979). The hydraulic conductivity should be determined by ASTM D2434 and reported to the Engineer.

3. Filter blanket material

Filter blanket material between the filter course and the reservoir course shall be an intermediate size between the finer filter course above, and the coarser reservoir course below, for the purpose of preventing the migration of a fine setting bed into the coarser reservoir material. An acceptable gradation shall be calculated based on selected gradations of the filter course and reservoir course using criteria outlined in the *HEC 11* (Brown and Clyde, 1989). A pea-gravel with a median particle diameter of 3/8" (9.5 mm) is commonplace.

4. Reservoir Coarse

Reservoir Coarse thickness is dependent upon the following criteria (that vary from site to site):

a. A 4" (10 cm) minimum thickness of reservoir course acts as a capillary barrier for frost heave protection. The reservoir course is located at the interface between subbase and native materials.

b. 4-in. (10 cm) minimum thickness if the underlying native materials are either well drained (Hydrologic Group A soils).

c. 8-in. (30 cm) minimum thickness if subdrains are installed. Subdrains insure that the subbase is well drained

d. Subdrains, if included, are elevated a minimum of 4" (10 cm) from the reservoir course bottom to provide storage and infiltration for the water quality volume. If the system is lined ,

e. Subbase thickness is determined from subbase materials having sufficient void space to store the design storm.

Table 1

US Standard Sieve Size Inches/mm	Percent Passing (%)			
	Choker Course (AASHTO No. 57)	Filter Course (Modified NHDOT 304.1)	Reservoir Course (AASHTO No. 3)	Reservoir Course Alternative* (AASHTO No. 5)
6/150	-	100	-	
2½/63	-		100	-
2 /50	-		90 – 100	-
1½/37.5	100		35 – 70	100
1/25	95 - 100		0 – 15	90 – 100
¾/19	-		-	20 - 55
½/12.5	25 - 60		0 - 5	0 - 10
3/8/9.5	-		-	0 - 5
#4/4.75	0 - 10	70-100	-	
#8/2.36	0 - 5		-	
#200/0.075		0 – 6**		
% Compaction ASTM D698 / AASHTO T99	95	95	95	95

* Alternate gradations (e.g. AASHTO No. 5) may be accepted upon Engineer's approval.
** Preferably less than 4% fines

5. Non-woven geotextile filter fabric

Filter fabric is *only recommended* for the sloping sides of the porous asphalt system excavation. It shall be Mirafi 160N, or approved equal and shall conform to the specifications in Table 3. Mirafi ® 160N is a non-woven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. 160N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

B) **Porous Asphalt Mix**

1. Mix materials

Mix materials consist of modified performance grade asphalt binder (PGAB), coarse and fine aggregates, and optional additives such as silicone, fibers, mineral fillers, fatty amines, and hydrated lime. Materials shall meet the requirements of the NAPA's Design, Construction, and Maintenance of Open-Graded Friction Courses, Information Series 115 (2002), except where noted otherwise below or approved in writing by the Engineer.

2. Polymer Modified PGAB and Mix Designs.

The asphalt binder shall be a polymer and/or fiber modified Performance Graded asphalt binder (PGAB) used in the production of Superpave Hot Mix Asphalt (HMA) mixtures. Ideally for maximum durability, the PGAB shall be two grades stiffer than that required for dense mix asphalt (DMA) parking lot installations, which is often achieved by adding a polymer and/or fiber. Mix designs will meet or exceed criteria listed in Table 5

The PGAB polymer modifiers are to be styrene butadiene rubber (SBR). SBR is feasible for smaller projects as it can be blended at the plant or terminal blended. The quantity of rubber solids in the SBR shall typically be 1.5-3% by weight of the bitumen content of the mix.

The dosage of fiber additives shall be either 0.3 percent cellulose fibers or 0.4 percent mineral fibers by total mixture mass. Fibers are a simple addition either manually for a batch plant or automated for larger drum plants. The binder shall meet the requirements of AASHTO M320.

The PGAB may be pre-blended or post-blended. The pre-blended binder can be pre-blended at the source or at a terminal. For post-blended addition, the modifier can either be in-line blended or injected into the pugmill at the plant.

The asphalt mix design is to be PG 64-28 with 5 pounds of fibers per ton of asphalt mix.

3. Anti-Stripping Mix Additives.

The mix shall be tested for moisture susceptibility and asphalt stripping from the aggregate by AASHTO T283. If the retained tensile strength (TSR) < 80% upon testing, a heat stable additive shall be furnished to improve the anti-stripping properties of the asphalt binder. Test with one freeze-thaw cycle (rather than five recommended in NAPA IS 115). The amount and type of additive (e.g. fatty amines or hydrated lime) to be used shall be based on the manufacturer's recommendations, the mix design test results, and shall be approved by the Engineer.

Silicone shall be added to the binder at the rate of 1.5 mL/m3 (1 oz. per 5000 gal). Fibers may be added per manufacturer and NAPA IS 115 recommendation if the draindown requirement cannot be met (<0.3% via ASTM D6390) provided that the air void content requirement is met (>18%, or >16% as tested with CoreLok device). Additives should be added per the relevant DOT specification and NAPA IS 115.

4. Coarse Aggregate.

Coarse aggregate shall be that part of the aggregate retained on the No. 8 sieve; it shall consist of clean, tough, durable fragments of crushed stone, or crushed gravel of uniform quality throughout. Coarse aggregate shall be crushed stone or crushed gravel and shall have a percentage of wear as determined by AASHTO T96 of not more than 40 percent. In the mixture, at least 75 percent, by mass (weight), of the material coarser than the 4.75 mm (No. 4) sieve shall have at least two fractured faces, and 90 percent shall have one or more fractured faces (ASTM D5821). Coarse aggregate shall be free from clay balls, organic matter, deleterious substances, and a not more than 8.0% of flat or elongated pieces (>3:1) as specified in ASTM D4791.

5. Fine Aggregate.

The fine aggregate shall be that part of the aggregate mixture passing the No. 8 sieve and shall consist of sand, screenings, or combination thereof with uniform quality throughout. Fine aggregate shall consist of durable particles, free from injurious foreign matter. Screenings shall be of the same or similar materials as specified for coarse aggregate. The plasticity index of that part of the fine aggregate passing the No. 40 sieve shall be not more than 6 when tested in

accordance with AASHTO T90. Fine aggregate from the total mixture shall meet plasticity requirements.

6. Porous Asphalt Mix Design Criteria.

The Contractor shall submit a mix design at least 10 working days prior to the beginning of production. The Contractor shall make available samples of coarse aggregate, fine aggregate, mineral filler, fibers and a sample of the PGAB that will be used in the design of the mixture. A certificate of analysis (COA) of the PGAB will be submitted with the mix design. The COA will be certified by a laboratory meeting the requirements of AASHTO R18. The Laboratory will be certified by the state DOT, regional equivalent (e.g. NETTCP), and/or qualified under ASTM D3666. Technicians will be certified by the regional certification agency (e.g. NETTCP) in the discipline of HMA Plant Technician.

Bulk specific gravity (SG) used in air void content calculations shall not be determined and results will not be accepted using AASHTO T166 (saturated surface dry), since it is not intended for open graded specimens (>10% AV). Bulk SG shall be calculated using AASHTO T275 (paraffin wax) or ASTM D6752 (automatic vacuum sealing, e.g. CoreLok). Air void content shall be calculated from the bulk SG and maximum theoretical SG (AASHTO T209) using ASTM D3203.

The materials shall be combined and graded to meet the composition limits by mass (weight) as shown in **Table 2.**

Table 2: Porous Asphalt Mix Design Criteria.

Sieve Size (inch/mm)	Percent Passing (%)
0.75/19	100
0.50/12.5	85-100
0.375/9.5	55-75
No.4/4.75	10-25
No.8/2.36	5-10
No.200/0.075 (#200)	2-4
Binder Content (AASHTO T164)	6 - 6.5%
Fiber Content by Total Mixture Mass	0.3% cellulose or
	0.4% mineral
Rubber Solids (SBR) Content by Weight of the Bitumen	1.5-3% or TBD
Air Void Content (ASTM D6752/AASHTO T275)	16.0-22.0%
Draindown (ASTM D6390)*	< 0.3 %
Retained Tensile Strength (AASHTO 283)**	> 80 %
Cantabro abrasion test on unaged samples (ASTM D7064-04)	< 20%
Cantabro abrasion test on 7 day aged samples	< 30%

C. Production

1. Mixing Plants.

Mixing plants shall meet the requirements of hot mix asphalt plants as specified in the state DOT or regional equivalent unless otherwise approved by the Engineer (e.g. Section 401- Plant Mix Pavements – General for Quality Assurance specifications in the Standard Specifications for Road and Bridge Construction – State of New Hampshire DOT, 2006, or latest revised edition and including supplemental specifications and updates).

2. Preparation of Asphalt Binder.

The asphalt material shall be heated to the temperature specified in the state DOT specification (if using a DOT spec for the mix) in a manner that will avoid local overheating. A continuous supply of asphalt material shall be furnished to the mixer at a uniform temperature.

3. Preparation of Aggregates.

The aggregate for the mixture shall be dried and heated at the mixing plant before being placed in the mixer. Flames used for drying and heating shall be properly adjusted to avoid damaging the aggregate and depositing soot or unburned fuel on the aggregate.

4. Mineral filler

Mineral filler if required to meet the grading requirements, shall be added in a manner approved by the Engineer after the aggregates have passed through the dryer.

5. Mixing.

The above preparation of aggregates does not apply for drum-mix plants. The dried aggregate shall be combined in the mixer in the amount of each fraction of aggregate required to meet the job-mix formula and thoroughly mixed prior to adding the asphalt material.

The dried aggregates shall be combined with the asphalt material in such a manner as to produce a mixture that when discharged from the pugmill is at a target temperature in the range that corresponds to an asphalt binder viscosity of 700 to 900 centistokes and within a tolerance of ± 11 °C (± 20 °F).

The asphalt material shall be measured or gauged and introduced into the mixer in the quantity determined by the Engineer for the particular material being used and at the temperature specified in the relevant specification.

After the required quantity of aggregate and asphalt material has been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of the particles and a thorough

distribution of the asphalt material throughout the aggregate is secured. The mixing time will be regulated by the Engineer.

All plants shall have a positive means of eliminating oversized and foreign material from being incorporated into the mixer.

460.503 Installation

A. **Porous Media Beds**

Protection of native materials from over compaction is important. Proper compaction of select subbase materials is essential. Improper compaction of subbase materials will result in either 1) low pavement durability from insufficient compaction, or 2) poor infiltration due to over-Compaction of subbase. Care must be taken to assure proper compaction as detailed below.

1. Grade Control

Establish and maintain required lines and elevations. The Engineer shall be notified for review and approval of final stake lines for the work before construction work is to begin. Finished surfaces shall be true to grade and even, free of roller marks and free of puddle forming low spots. All areas must drain freely. Excavation elevations should be within +/- 0.1 ft (+/- 3 cm).

If, in the opinion of the Engineer, based upon reports of the testing service and inspection, the quality of the work is below the standards which have been specified, additional work and testing will be required until satisfactory results are obtained.

The Engineer shall be notified at least 24 hours prior to all porous media bed and porous pavement work.

2. Subgrade Preparation

Native subgrade refers to materials beyond the limit of the excavation. The existing native subgrade material under all bed areas shall NOT be compacted or subject to excessive construction equipment traffic prior to geotextile and stone bed placement. Compaction is acceptable if an impermeable liner is used at the base of the porous asphalt system and infiltration is not desired.

Where erosion of the native material subgrade has caused accumulation of fine materials and/or surface ponding, this material shall be removed with light equipment and the underlying soils scarified to a minimum depth of 6 inches with a York rake or equivalent and light tractor.

Bring subgrade to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction before the placing of the stone subbase.

All bed bottoms are as level as feasible to promote uniform infiltration. For pavements subbases constructed on grade, soil or fabric barriers should be constructed along equal elevation for every 6-12” of grade change to act as internal check dams. This will prevent erosion within the subbase on slope.

3. Porous Media Bed Installation

Subbase refers to materials below pavement surface and above native subgrade. Upon completion of subgrade work, the Engineer shall be notified and shall inspect at his/her discretion before proceeding with the porous media bed installation.

Sideslope geotextile and porous media bed aggregate shall be placed immediately after approval of subgrade preparation. Any accumulation of debris or sediment which has taken place after approval of subgrade shall be removed prior to installation of geotextile at no extra cost to the Owner.

Place sideslope geotextile in accordance with manufacturer's standards and recommendations. Adjacent strips of geotextile shall overlap a minimum of sixteen inches (16"). Secure geotextile at least four feet (1.2 m) outside of the bed excavation and take any steps necessary to prevent any runoff or sediment from entering the storage bed.

Install filter course aggregate in 8-inch maximum lifts to a MAXIMUM of 95% standard proctor compaction (ASTM D698 / AASHTO T99). Install aggregate to grades indicated on the drawings.

Install choker, gravel, and stone base course aggregate to a MAXIMUM of 95% compaction standard proctor (ASTM D698 / AASHTO T99). Choker should be placed evenly over surface of filter course bed, sufficient to allow placement of pavement, and notify Engineer for approval. Choker base course thickness shall be sufficient to allow for even placement of the porous asphalt but no less than 4-inches (10 cm) in depth.

The density of subbase courses shall be determined by AASHTO T 191 (Sand-Cone Method), AASHTO T 204 (Drive Cylinder Method), or AASHTO T 238 (Nuclear Methods), or other approved methods at the discretion of the supervising engineer.

The infiltration rate of the compacted subbase shall be determined by ASTM D3385 or approved alternate at the discretion of the supervising engineer. The infiltration rate shall be no less 5-30 ft/day or 50% of the hydraulic conductivity (D2434) at 95% standard proctor compaction (refer to section 2.1.A.5).

Compaction of subbase course material shall be done with a method and adequate water to meet the requirements. Rolling and shaping shall continue until the required density is attained. Water shall be uniformly applied over the subbase course materials during compaction in the amount necessary for proper consolidation.

Rolling and shaping patterns shall begin on the lower side and progress to the higher side of the subbase course while lapping the roller passes parallel to the centerline. Rolling and shaping shall continue until each layer conforms to the required grade and cross-section and the surface is smooth and uniform.

Following placement of subbase aggregate, the sideslope geotextile shall be folded back along all bed edges to protect from sediment washout along bed edges. At least a four-foot edge strip shall be used to protect beds from adjacent bare soil. This edge strip shall remain in place until all bare soils contiguous to beds are stabilized and vegetated. In addition, take any other necessary steps to prevent sediment from washing into beds during site development. When the site is fully stabilized, temporary sediment control devices shall be removed.

B. **Porous Asphalt Pavement Installation**

1. Mixing Plant

The mixing plant, hauling and placing equipment, and construction methods shall be in conformance with NAPA IS 131 and applicable sections of the state DOT's specification for asphalt mixes. The use of surge bins shall not be permitted.

2. Hauling Equipment.

The open graded mix shall be transported in clean vehicles with tight, smooth dump beds that have been sprayed with a non-petroleum release agent or soap solution to prevent the mixture from adhering to the dump bodies. Mineral filler, fine aggregate, slag dust, etc. shall not be used to dust truck beds. The open graded mix shall be covered during transportation with a suitable material of such size sufficient to protect the mix from the weather and also minimize mix cooling and the prevention of lumps. When necessary, to ensure the delivery of material at the specified temperature, truck bodies shall be insulated, and covers shall be securely fastened. Long hauls, particularly those in excess of 25 miles (40 km), may result in separation of the mix and its rejection.

3. Placing Equipment.

The paver shall be a self-propelled unit with an activated screed or strike-off assembly, capable of being heated if necessary, and capable of spreading and finishing the mixture without segregation for the widths and thicknesses required. In general, track pavers have proved superior for Porous Asphalt placement. The screed shall be adjustable to provide the desired cross-sectional shape. The finished surface shall be of uniform texture and evenness and shall not show any indication of tearing, shoving, or pulling of the mixture. The machine shall, at all times, be in good mechanical condition and shall be operated by competent personnel.

Pavers shall be equipped with the necessary attachments, designed to operate electronically, for controlling the grade of the finished surface.

The adjustments and attachments of the paver will be checked and approved by the Engineer before placement of asphalt material.

Pavers shall be equipped with a sloped plate to produce a tapered edge at longitudinal joints. The sloped plate shall be attached to the paver screed extension.

The sloped plate shall produce a tapered edge having a face slope of 1:3 (vertical: horizontal). The plate shall be so constructed as to accommodate compacted mat thickness from 35 to 100 mm (1 1/4 to 4 inches). The bottom of the sloped plate shall be mounted 10 to 15 mm (3/8 to 1/2 inch) above the existing pavement. The plate shall be interchangeable on either side of the screed.

Pavers shall also be equipped with a joint heater capable of heating the longitudinal edge of the previously placed mat to a surface temperature of 95 °C (200 °F), or higher if necessary, to achieve bonding of the newly placed mat with the previously placed mat. This shall be done without undue breaking or fracturing of aggregate at the interface. The surface temperature shall be measured immediately behind the joint heater. The joint heater shall be equipped with automated controls that shut off the burners when the pavement machine stops and reignite them with the forward movement of the paver. The joint heater shall heat the entire area of the previously placed wedge to the required temperature. Heating shall immediately precede placement of the asphalt material.

4. Rollers.

Rollers shall be in good mechanical condition, operated by competent personnel, capable of reversing without backlash, and operated at speeds slow enough to avoid displacement of the asphalt mixture. The mass (weight) of the rollers shall be sufficient to compact the mixture to the required density without crushing of the aggregate. Rollers shall be equipped with tanks and sprinkling bars for wetting the rolls.

Rollers shall be two-axle tandem rollers with a gross mass (weight) of not less than 7 metric tons (8 tons) and not more than 10 metric tons (12 tons) and shall be capable of providing a minimum compactive effort of 44 kN/m (250 pounds per inch) of width of the drive roll. All rolls shall be at least 1 m (42 inches) in diameter.

A rubber tired roller will not be required on the open graded asphalt friction course surface.

5. Conditioning of Existing Surface.

Contact surfaces such as curbing, gutters, and manholes shall be painted with a thin, uniform coat of Type RS-1 emulsified asphalt immediately before the asphalt mixture is placed against them.

6. Temperature Requirements.

The temperature of the asphalt mixture, at the time of discharge from the haul vehicle and at the paver, shall be between 135-163°C (275 to 325°F), within 6 °C (10 °F) of the compaction temperature for the approved mix design

7. Spreading and Finishing.

The Porous Asphalt shall be placed either in a single application at 4 inches (10 cm) thick or in two lifts. If more than one lift is used, great care must be taken to insure that the porous asphalt layer join completely. This means: keeping the time between layer placements minimal; keeping the first layer clear from dust and moisture, and minimizing traffic on the first layer.

The Contractor shall protect all exposed surfaces that are not to be treated from damage during all phases of the pavement operation.

The asphalt mixture shall be spread and finished with the specified equipment. The mixture shall be struck off in a uniform layer to the full width required and of such depth that each course, when compacted, has the required thickness and conforms to the grade and elevation specified. Pavers shall be used to distribute the mixture over the entire width or over such partial width as practical. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture shall be spread and raked by hand tools.

No material shall be produced so late in the day as to prohibit the completion of spreading and compaction of the mixture during daylight hours, unless night paving has been approved for the project

No traffic will be permitted on material placed until the material has been thoroughly compacted and has been permitted to cool to below 38 °C (100 °F). The use of water to cool the pavement is not permitted. The Engineer reserves the right to require that all work adjacent to the pavement, such as guardrail, cleanup, and turf establishment, is completed prior to placing the wearing course when this work could cause damage to the pavement. On projects where traffic is to be maintained, the Contractor shall schedule daily pavement operations so that at the end of each working day all travel lanes of the roadway on which work is being performed are paved to the same limits. Suitable aprons to transition approaches, where required, shall be placed at side road intersections and driveways as directed by the Engineer.

8. Compaction.

Immediately after the asphalt mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The compaction objective is 16% - 19% in place void content (Corelock).

Breakdown rolling shall occur when the mix temperature is between 135-163°C (275 to 325°F).

Intermediate rolling shall occur when the mix temperature is between 93-135°C (200 to 275°F).

Finish rolling shall occur when the mix temperature is between 66-93°C (150 to 200°F).

The cessation temperature occurs at approximately 79°C (175°F), at which point the mix becomes resistant to compaction. If compaction has not been done at temperatures greater than the cessation temperature, the pavement will not achieve adequate durability.

The surface shall be rolled when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving.

Rollers or oscillating vibratory rollers, ranging from 8-12 tons, shall be used for compaction. The number, mass (weight), and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. Generally, one breakdown roller will be needed for each paver used in the spreading operation.

To prevent adhesion of the mixture to the rolls, rolls shall be kept moist with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot or lightly oiled hand tampers, smoothing irons or with mechanical tampers. On depressed areas, either a trench roller or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Other combinations of rollers and/or methods of compacting may be used if approved in writing by the Engineer, provided the compaction requirements are met.

Unless otherwise specified, the longitudinal joints shall be rolled first. Next, the Contractor shall begin rolling at the low side of the pavement and shall proceed towards the center or high side with lapped rollings parallel to the centerline. The speed of the roller shall be slow and uniform to avoid displacement of the mixture, and the roller should be kept in as continuous operation as practical. Rolling shall continue until all roller marks and ridges have been eliminated.

Rollers will not be stopped or parked on the freshly placed mat.

It shall be the responsibility of the Contractor to conduct whatever process control the Contractor deems necessary. Acceptance testing will be conducted by the Engineer using cores provided by the Contractor.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture. The mixture shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of binder shall be removed and replaced. These replacements shall be at the Contractor’s expense.

9. Joints.

Joints between old and new pavements or between successive day's work shall be made to ensure a thorough and continuous bond between the old and new mixtures. Whenever the spreading process is interrupted long enough for the mixture to attain its initial stability, the paver shall be removed from the mat and a joint constructed.

Butt joints shall be formed by cutting the pavement in a vertical plane at right angles to the centerline, at locations approved by the Engineer. The Engineer will determine locations by using a straightedge at least 4.9 m (16 feet) long. The butt joint shall be thoroughly coated with Type RS-1 emulsified asphalt just prior to depositing the pavement mixture when pavement resumes.

Longitudinal joints that have become cold shall be coated with Type RS-1 emulsified asphalt before the adjacent mat is placed. If directed by the Engineer, joints shall be cut back to a clean vertical edge prior to applying the emulsion.

COMPENSATION

460.51 Basis of Payment

Payment for work under this item shall be at the contract unit price, Square Yard, which price shall include all labor, materials, dump fees, and incidental expenses required for removal and disposal of materials obstructing execution of required work as specified herein.

120.82 Payment Item

460.50	Porous Asphalt Pavement	Square Yard

ITEM 460. HOT MIX ASPHALT TON

The work under this item shall conform to the relevant provisions of Section 460 of the Standard Specifications, Document 00717 SUPERPAVE REQUIREMENTS and the following:

It is intended that Superpave mixes be placed for the roadway surface, intermediate and base courses, as well as for all hot mix asphalt driveways, driveway aprons and ped/bike surfaces.

Note: The hot mix asphalt (HMA) Drives with Superpave HMA mixtures shall be paved in accordance with Section 701 of the Standard Specification which shall be the basis for the work and paid for under Item 703. Hot Mix Asphalt Driveways.

CONSTRUCTION METHODS

The Superpave mixes shall be placed and compacted only at such times as to permit the proper inspection and checking by the Engineer. Paver speed may not exceed 40 feet per minute.

The mixtures shall be placed only upon approved clean and dry surfaces; and when weather conditions are suitable. The engineer may however, at the entire responsibility of the Contractor, permit work to continue when over-taken by sudden rain, up to and only the amount of material which may be in transit from the plant at the time and then only when the temperature of the mixture is within the temperature limits specified and the existing surface on the roadway is not excessively wet.

The bituminous concrete shall be placed in courses as specified and as directed by the Engineer.

When an existing surface or new base upon which the bottom course is to be placed contains unsatisfactory irregularities, in the Engineer's judgment, such irregularities shall be eliminated by an adequate placing and compaction of mixture so as to furnish a surface with true contour and grade before placing any actual set course of mixture.

Any surface upon which new mixture is placed shall be clean from foreign materials of any nature, dry, at the required temperature and prime coated as may be necessary.

After the paving mixture has been spread, compactive effort shall be applied by the use of power rollers of sufficient size, weight and capabilities to achieve the specified compaction.

Each roller shall be operated by a competent, experienced roller operator. The mixture shall be rolled longitudinally, diagonally and transversely as may be necessary to produce the required contour for surface. Longitudinal rolling shall start at the side and proceed toward the center of the pavement, except on super elevated curves where the rolling shall begin on the low side and progress to the high side, overlapping on successive trips by at least 12 inches. The rolling shall be continued and so executed that all roller marks, ridges, porous spots and impressions are eliminated and the resulting surface has the required grade and contour. The motion of the rollers shall at all times be slow enough to avoid any displacement of the hot mixtures; and any displacement or marring of the surface occurring as a result of reversing the direction of the

rollers, or from any other cause, shall be corrected. To prevent adhesion with the mixture, the wheels of the rollers shall be kept lightly moistened with water but excess water will not be permitted. The use of oil for this purpose will not be allowed.

Along curbs, structures and all places not accessible with a roller, the mixture shall be thoroughly compacted with tampers or plate compactors. Such tampers shall weigh not less than 25 pounds and shall have a tamping face of not more than 50 square inches. The surface of the mixture after compaction shall be smooth and true to the established line and grade.

Any mixture that becomes loose or broken, mixed with dirt, or in any way defective shall be removed and replaced with new mixture that shall be compacted to conform to the surrounding area. Areas of one square foot or more showing an excess of bitumen shall be removed and replaced.

All joints shall be painted with emulsion and the surface sanded immediately after compacting has been completed.

If, at any time before the final acceptance of the work, any soft, imperfect places or spots shall develop in the surface all such places shall be removed and replaced with new materials and then compacted until the edges at which the new work connects with the old become invisible.

All such removal and replacement of unsatisfactory surfacing shall be done by the contractor as part of the payment made to him for the relevant contract items.

No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climate or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.

Quality Assurance and Material Testing

Field Placed HMA Material - HMA material placed in the field shall be tested for both joint and mat density on a completed street or public facility basis. The Engineer may conduct any necessary testing to monitor that the specified density, uniformity and smoothness is being achieved. A properly correlated nuclear gauge should beused to monitor the pavement density in accordance with ASTM D2950.

BASIS OF PAYMENT

Hot Mix Asphalt will be measured for payment by the ton, complete in place.

Hot Mix Asphalt will be paid for at the Contract unit price per ton, which price shall include all labor, materials, equipment and incidental costs required to complete the work. Hot mix asphalt roadway surface, intermediate and base courses shall be paid for under Item 460 regardless of material type. All HMA driveways and driveway aprons shall be paid for under Item 703.

Asphalt emulsion for tack coat, and HMA joint sealant shall be incidental to Item 460.

ITEM 506.	**GRANITE CURB TYPE VB – STRAIGHT**	**FOOT**
ITEM 506.1	**GRANITE CURB TYPE VB – CURVED**	**FOOT**
ITEM 509.	**GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS – STRAIGHT**	**FOOT**
ITEM 509.1	**GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS – CURVED**	**FOOT**
ITEM 580.1	**CURB REMOVED, RELOCATED AND RESET**	**FOOT**

The work under this item shall conform to the relevant provisions of Section 501 of the Standard Specifications and the following:

Sawcutting, Excavation, Disposal of Excavated Material, and Concrete for setting and resetting all curbing and edging items shall be considered incidental to and included in each payment item. Concrete for curb and edging items shall be placed in accordance with the detail provided in the drawings.

All reset and new curbing and edging shall be adjusted and set on a 6”x18” compacted DGCS base. Existing material can be reused if determined to be acceptable by the Engineer.

ITEM 594. CURB REMOVED AND DISCARDED FOOT

The work under this item shall conform to the relevant provisions of Section 501 of the Standard Specifications and the following:

GENERAL

Work under this Item shall include the removal, transporting and legally discarding of the existing granite curbing as directed by the Engineer. It is anticipated that any existing curb that is in suitable condition will be relocated and/or reset as part of the project.

METHOD OF MEASUREMENT

Curb removed and discarded will be measured for payment by the foot.

BASIS OF PAYMENT

Curb removed and discarded will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 644.172 72 INCH CHAIN LINK FENCE (STW) VINYL COATED (LINE POST OPT.) FOOT

The work under this item shall conform to the relevant provisions of Section 644 of the Standard Specifications and the following:

GENERAL

A. Submit Shop Drawings, samples, and product literature for all materials to complete the thermal fusion bonded chain link fence installation Work for approval. Contractor shall check dimensions in the field and dimensions shown on Contract Drawings before final submittal of Shop Drawings. Contractor shall not procure materials or begin fabrication until Shop Drawings, samples, and product literature submittals are approved.

B. General:
   1. Chain link fence and gate framework and fittings shall be in accordance with US Government Specification RR-F-191 for fusion bonded polyvinyl chloride on galvanized steel. Processes or materials used shall not be proprietary or restrictively patented. The fence fabric shall be imprint branded at each link with the Manufacturer's trade name, country of origin (USA) gauge core wire size and tensile strength. All pipe shall be Schedule 40 imprinted with trade name. All fittings shall be marked to show trade name.
   2. The Manufacturer shall supply a notarized certification that all materials used have been tested and fully comply with the specifications specified herein.
   3. Sleeves if required for fence shall be hot-dipped galvanized inside and out steel pipe Schedule 40 ASTM 120 sizing as required to accommodate posts.
   4. All chain link gates and fence shall be provided from the same Manufacturer.

5. All coatings shall black and shall be lead free.
6. Submit Shop Drawings, samples, and product literature for all materials to complete the work for approval of Landscape Architect for both new fence and gates and new fabric installed on existing steel fence..

C. Chain Link Fence Fabric:

1. Fusion bonded chain link fabric shall be No. nine (9) gauge “steel core wire” with a uniform square mesh measuring approximately one (1) inch between its parallel sides, woven out of permafused wire with a (9) gauge “steel core wire” which shall consist of a good commercial quality galvanized steel to which a minimum seven (7) mil coating of polyvinyl chloride has been bonded by the fusion method as per ASTM F 668, Class 2B.
2. The polyvinyl chloride vinyl in the coating shall have a maximum specific gravity of 1.34, be evenly applied and free of blisters, with the bond between the vinyl coating and the steel core wire equal or greater than the cohesive strength of the vinyl. The color of the coating shall be black.
3. The minimum breaking strength of the fusion-bonded wire shall be 800 pounds. Bottom of fence fabric shall be two (2) inches plus or minus one-quarter (¼) inch above the finished grade. Fabric shall be furnished with selvages knuckled on both ends, which have been coated during the waiving process.

D. Framework:

1. Line corner and terminal posts, top, bottom or intermediate rails shall be Schedule 40 hot-dipped galvanized steel conforming to ASTM-120 latest requirements and thermal fusion bonded with a polyvinyl chloride (PVC) by the electrostatically applied powder fusion process. The coating depth shall be 10-15 mils in thickness according to pipe diameter.
2. The vinyl shall be plasticised and thoroughly compounded so there are no under dispersed pigments, stabilizers or other discrete particles present. The color shall match the fabric; color black.

E. Top, Mid and Bottom Rails:

1. All rails shall be one and five-eighths (1-5/8") inch O.D. thermal fusion bonded PVC galvanized steel pipe, of twenty-one (21') foot lengths joined by six (6") inch long sleeves, thermal fused, rail to run continuously along top of fence.
2. Bottom and mid rails shall conform to specifications for top rail and shall be joined at line posts with thermal fusion coated PVC boulevard clamps.

F. Line Posts:

1. Line posts shall be thermal fusion bonded PVC galvanized steel pipe sized as shown on the Drawings. Posts shall be of sufficient length to allow for installation to a depth of approximately three (3’) foot below grade level or as shown on the Drawings and approved Shop Drawings and shall be spaced in the line of fence not further apart than ten feet (10') or as shown on the Drawings. The fabric shall be fastened to the line posts by means of matching nine (9) gauge core, thermal fusion coated PVC ties, maximum twelve inches (12") on center.

2. Provide galvanized steel sleeves galvanized inside and out as required, sized to accommodate posts as shown on the Drawings and approved Shop Drawings.

G. Corner, Terminal, and Gate Posts:

1. Corner, terminal, and gate posts shall be sized as shown on the Drawings and approved Shop Drawings and shall be thermal fusion bonded PVC galvanized steel. Each post shall be of sufficient length to allow for required depth of approximately three (3) foot below grade level. Fabric shall be attached to the terminal post by means of thermal fusion bonded PVC tension bars and held by thermal fusion coated PVC tension bands, maximum twelve (12") inches on center.
2. Stretches of fence more than five hundred (500') feet in length shall have one intermediate terminal pull post with braces in two directions for every five hundred (500') feet. Corner posts shall be placed at every change in direction. All corners and terminal posts shall be braced with thermal fusion bonded PVC galvanized steel one and five-eighths (1-5/8") inch O.D. brace rail, weighing 1.35 pounds per foot minimum eight (8') feet long, with a diagonal three-eighths (3/8") inch truss rod, and attachment to the first ensuing line post.
3. Provide galvanized steel sleeves galvanized inside and out as required, sized to accommodate posts and as shown on the Drawings and approved Shop Drawings.

H. Fittings: All fittings and other appurtenances shall be aluminum alloy, pressed steel, malleable or cast steel, epoxy-phenolic primed and coated with matching (PVC) by the thermal fusion bonded method. Painted fittings are not acceptable.

I. Concrete for footings including reinforcing shall be 4000-psi 28-day air-entrained concrete conforming to the requirements and applicable provisions of Section M4 of the "Standard Specifications", latest edition.

J. Grout shall be non-shrinking, non-metallic, non-staining, such as "Hallenite Por-Rok Epoxy Grout" or approved equal by Sonneborn "Sonogrout,' Penn Dixie, or Master Builders. Submit manufacturer for approval.

CONSTRUCTION

A. Examine final grades and installation conditions. Do not start Work of this item until unsatisfactory conditions are corrected.

B. Locate and install all posts for fence in concrete footings or in galvanized steel sleeves plumb and true to line and grade. Locate and install fence fabric on existing steel fence. All installed materials shall be new and without imperfections and shall be furnished, delivered, erected, connected, and finished in every detail. Height of fence and installation shall be as shown on the Drawings and in accordance with approved Shop Drawings.

1. Chain Link Fence of the type and size detailed on the plans shall meet the minimum requirements specified in the Chain Link Fence Manufactures Institute Product Manual requirements.

C. Top and bottom edge of fence fabric shall have knuckled edges. Fabric shall be stretched uniformly taut and as tight as possible, true to line and grade and complete in all details. Install tension bars at corners. Bands and clips to tie fabric to rails and posts shall be spaced a maximum of twelve inches on center.

D. All posts shall have continuous horizontal braces at the top, middle, and bottom. In addition, all end and corner posts shall be braced to the nearest line post with center brace rails. Outside sleeve type top rail couplings shall be placed a maximum of twelve (12) inches from posts.

E. Chain link fence shall have continuous top, mid, and bottom rails.

F. All chain link fences shall be fastened on the outside of the posts unless directed otherwise by the Owner. The fabric shall be properly stretched and securely fastened to the posts and between posts the top and bottom of the fabric shall be fastened to the horizontal braces as specified, herein.

G. The fabric shall be fastened to end and corner posts with tension bars and stretcher bar bands spaced at one (1') foot intervals.

H. All fabric shall be aligned so that top row of the fabric mesh is tied to the top rail every twelve (12") inches on center and so that the bottom of the fabric mesh stands two (2") inches above the finish grade. The bottom row of the fabric mesh shall be tied to the bottom rail every twelve (12") inches on center.

I. Fabric shall be fastened to line posts, rails and braces with nine gauge (0.148) annealed galvanized steel fused vinyl wire, spaced at twelve (12") inches on center; ties to be twisted.

METHOD OF MEASUREMENT

72 Inch Chain Link Fence (STW) Vinyl Coated (Line Post Opt.) will be measured for payment by the foot.

BASIS OF PAYMENT

72 Inch Chain Link Fence (STW) Vinyl Coated (Line Post Opt.) will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for the concrete for footings, grout, fittings, fasteners or any other materials necessary to complete the work, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 665.2 CHAIN LINK FENCE REMOVED AND DISCARDED FOOT

The work under this item shall conform to the relevant provisions of Section 665 of the Standard Specifications and the following:

GENERAL

Work under this Item shall include the removal, transporting and discarding of the existing chain link fence as shown on the plans and as directed by the Engineer. The fence shall be removed from the project and disposed of legally.

METHOD OF MEASUREMENT

Chain link fence removed and discarded will be measured for payment by the foot.

BASIS OF PAYMENT

Chain link fence removed and discarded will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 691.01 LANDSCAPE BOULDER EACH

DESCRIPTION

The work shall consist of furnishing and placement of individual boulders to provide physical barriers. Locate and install boulders as shown on the plans and as directed by the Engineer. Boulders shall be placed with the "best side" up. A base 6 inches thick of crushed stone shall be placed under each stone.

MATERIALS

Landscape boulder shall be clean, solid, durable stone boulders that can easily be placed as directed. The boulder shall have an approximate minimum width, length and height of 3 feet and a maximum width, length and height of 5 feet. The ratio between the smallest and largest dimension shall not exceed 1.5. The boulder shall also be as near to round or cubical dimensions as practical and reasonable to be accepted as suitable. No flat or elongated boulders will be accepted. The top of the boulders shall be in reasonable horizontal and vertical alignment to provide a pleasing appearance when used with other boulders in the construction of a barrier. The Contractor shall submit details and photos of the proposed boulders for approval. Crushed stone shall conform to the relevant provisions of Section 402 of the Standard Specification.

CONSTRUCTION

Landscape boulders shall be placed at the location shown on the plans and as directed by the Engineer. Boulders shall be placed to create a smooth and uniform barrier in every direction.

The ground beneath the rock boulder shall be excavated to specified depth to accept crushed stone. Stone shall be graded or shaped to receive the boulder so as to prevent any rocking or movement of the boulder.

COMPENSATION

Landscape boulders will be measured for payment by each boulder placed, complete in place.

Landscape boulders will be paid for at the Contract price each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for transportation, excavation and crushed stone, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 697.1 SILT SACK EACH

The work under this item shall conform to the relevant provisions of Section 670 of the Standard Specifications and the following:

GENERAL

The work under this item includes the furnishing, installation, maintenance and removal of a reusable fabric sack to be installed in drainage structures for the protection of wetlands and other resource areas and the prevention of silt and sediment from the construction site from entering the storm water collection system. Devices shall be ACF Environmental (800)-448-3636; Reed & Graham, Inc. Geosynthetics (888)-381-0800; The BMP Store (800)-644-9223; or approved equal.

CONSTRUCTION

Silt sacks shall be installed in retained existing and proposed catch basins and drop inlets within the project limits and as required by the Engineer.

The silt sack shall be as manufactured to fit the opening of the drainage structure under regular flow conditions, and shall be mounted under the grate. The insert shall be secured from the surface such that the grate can be removed without the insert discharging into the structure. The filter material shall be installed and maintained in accordance with the manufacturer's written literature and as directed by the Engineer.

Silt sacks shall remain in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site.

The Contractor shall inspect the condition of silt sacks after each rainstorm and during major rain events. Silt sacks shall be cleaned periodically as directed by the manufacturer to remove and disposed of accumulated debris as required. Silt sacks, which become damaged during

construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

When emptying the silt sack, the contractor shall take all due care to prevent sediment from entering the structure. Any silt or other debris found in the drainage system at the end of construction shall be removed at the Contractors expense. The silt and sediment from the silt sack shall be legally disposed of offsite. Under no condition shall silt and sediment from the insert be deposited on site and used in construction.

All curb openings shall be blocked to prevent stormwater from bypassing the device.

METHOD OF MEASUREMENT

Silt sacks will be measured for payment by the each, complete in place.

BASIS OF PAYMENT

Silt sacks will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for removal and disposal of the sediment from the insert, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 701.	**CEMENT CONCRETE SIDEWALK**	**SY**
ITEM 701.1	**CEMENT CONCRETE SIDEWALK AT DRIVEWAYS**	**SY**
ITEM 701.2	**CEMENT CONCRETE WHEELCHAIR RAMP**	**SY**
ITEM 701.3	**CAST IRON DETECTABLE WARNING PANELS**	**SF**

The work under these items shall conform to the relevant provisions of Section 701 of the Standard Specifications and the following:

1. Concrete shall be formed, placed on an approved base, properly finished and cured by experienced concrete finishers under the inspection of the Department of Public Works.
2. Concrete shall be "Class D" (4,000 p.s.i.) in accordance with Section M4.02.00 of the "Standard Specifications for Highways and Bridges" of the Massachusetts Highway Department with 610 lbs. of portland cement, maximum aggregate size of ¾" and 0.20 gallons of Carbo Jet Dispersed Carbon Black or 2.0 pounds of Lamp Black color admixture per cubic yard of concrete with 6% ± 1% entrained air in place.
3. Concrete slump shall not exceed five (5) inches.
4. Thickness of concrete sidewalks shall be four (4) inches. Thickness of wheelchair ramps and concrete driveways shall be six (6) inches.
5. Concrete walks shall be non-reinforced.
6. Control joints shall be straight, 3/8 inch wide, and to a depth equal to one-quarter of the finished depth. Spacing of control joints will depend on the width of the sidewalk and shall form square or nearly square panels.

7. The concrete shall be screeded and darbied or bull floated (not to excess). A proper waiting period shall be allowed for settlement and bleeding before final finishing. A transverse soft broom finish is required.
8. Concrete shall be sprayed in two directions with an adequate amount of impervious membrane curing compound according to Subsection 476.71C of the "Standard Specifications for Highways and Bridges". Type 2 Liquid Membrane-Forming compounds for Curing Concrete shall be used on accordance with ASTM Designation C-309-58 or AASHO Designation M140-57 or the latest revision thereof.
9. Expansion joints shall be to the full depth and width of the concrete slab and shall be placed at vertical or horizontal direction changes, where pavement thickness changes, at each end of tree pits, and around all poles.
10. Bond breaking material shall be used where concrete is placed against foundations, walls, etc. Repairs at the backline of the sidewalk shall be considered incidental to the sidewalk, driveway and wheelchair ramp work.

All concrete walk layout and design shall be reviewed with the Engineering Division representatives well in advance of construction and shall be inspected by this Division during construction. Air tests and strength cylinders may be taken by the Division to verify proper materials and compliance with the specifications.

All equipment, materials and tools shall be on the job before placing concrete.

All Concrete sidewalks, driveways, curb ramps, detectable warning panels and crosswalks shall be installed in accordance with the most recent Massachusetts Architectural Access Board (A.A.B.) and A.D.A. Accessibility Guidelines. In case of a conflict, the more stringent requirement shall be followed. The Contractor shall make every reasonable effort to construct the sidewalk in compliance with ADA and AAB standards. It is the responsibility of the Contractor to notify the Engineer of any repair that can not be constructed to the applicable ADA and AAB standards.

All work that does not meet the ADA and AAB standards shall be replaced by the Contractor with no additional cost to the Department of Public Works.

Detectable Warning Panels meeting all applicable ADA and MA AAB regulations shall be installed at every wheelchair ramp locations. The Detectable Warning Panels shall be cast-in-place type, natural in color and made of **CAST IRON**.

Manufacturers: East Jordan Iron Works, Neenah Foundry or Approved Equal.

The bid price for items 701, 701.1 and 701.2 shall be full compensation for all sawcutting, excavation, hauling and disposal of existing sidewalks, driveways and wheelchair ramps regardless of material, and all grading, compacting, furnishing, and placing all materials including forms and equipment, tools and all other incidental work necessary for final completion of the items as specified.

If subsequent testing on hardened concrete by the Department of Public Works shows that the concrete does not meet the specification requirements, the Contractor shall in addition to being

responsible to replace any material or workmanship which is rejected, shall also be responsible for the cost of testing.

The Contractor shall be responsible to protect the newly poured concrete surface against vandalism and marking or defacing, and must replace any concrete flatwork which, in the opinion of the Engineer, are excessively marked or defaced without any additional compensation.

The Contractor shall be required to provide safe and convenient access to all residences, stores, and businesses during construction operations.

ITEM 703. HOT MIX ASPHALT DRIVEWAY TON

The work under these items shall conform to the relevant provisions of Section 701 of the Standard Specifications and the following:

The hot mix asphalt shall be consistent with Section 455 Superpave. The Superpave shall not be subject to QA sampling and testing.

ITEM 707.1 PARK BENCH EACH

GENERAL

The work under this section will be to furnish and install benches as specified below and on the Plans.

MATERIALS

WOOD AND CAST IRON BENCH

A. Submit Shop Drawings and product literature for all materials to complete the work for approval of Landscape Architect.

B. Benches shall be the "Boston Bench Model B-76D" as manufactured by Resources Inc., Concord, MA. telephone (617) 419-0138. Bench shall be eight (8') foot in length with a center arm rest. All cast iron shall have factory finish polyester powder coating, color deep black.

C. Cast iron shall have a tensile strength of 25,000 lbs. and conform to requirements of ASTM A48-64. The supplier shall supply a certificate attesting that cast iron used for the project meets the following requirements

1. Maximum percentages as follows: Carbon 3.6%
   Silicon 2.5%
   Sulfur .5%
   Phosphorous .3%
2. Maximum percentages as follows: Manganese `. 45%

D. Wood shall be select grade IPE S4S uniform in appearance. Sizes shall conform to dressing in accordance with American Lumber Standards. Top and bottom slats of benches shall be "Pressley" mold. All wood shall be coated with a clear sealant. Submit product literature for clear sealant.

E. All hardware except anchor bolts shall be stainless steel conforming to AISI Type 304 and ASTM A193 requirements, sizes as shown on the Drawings. Asphalt anchor bolts and carriage bolts shall be galvanized steel grouted in with threads down. All exposed bolts shall be painted to match ductile iron castings.

F. Grout shall be specifically intended for secure attachment to hot mix asphalt material and subject to shop drawing approval.

CONSTRUCTION

WOOD AND CAST IRON BENCH

A. Locate and install benches in locations shown on the Drawings and in conformance with approved Shop Drawings. The Landscape Architect shall approve placement and height relationship. All bench locations shall meet or exceed the latest requirements of the ADA and AAB, standards for universal accessibility placement and clearances.

B. The Contractor shall be responsible for timing the delivery of all materials required to install benches so as to minimize on-site storage time prior to installation. All stored materials and items must be protected from weather, careless handling or vandalism.

C. All fabrication shall be accomplished using the highest standards of workmanship. Individual steel pieces shall be saw cut and carefully fit together. All connections shall be secured and flush. All fabricated items shall be fine sanded throughout to produce a high standard of surface smoothness. All surfaces and connections shall be without visible grinding marks, surface differentiation or variation.

D. Fasten wood members to stanchions or supports before or after stanchions are secured to footings; pre-drill all fastener holes. Take necessary precautions not to over tighten fasteners. Anchors shall be epoxied in place as shown on the Drawings.

E. All material that is specified to be galvanized shall be hot-dipped galvanized after fabrication and then primed and painted. Exterior metal to be primed and painted shall have two (2) costs of primer and three (3) coats of finished paint.

F. Touch-up and repair paint for damaged surfaces, bolted connections and abraded areas shall conform to the following:

1. At galvanized surfaces, apply organic zinc repair paint. Galvanizing repair paint shall have ninety-five (95%) percent zinc by weight. Touch-up with aerosol sprays is not acceptable.
2. For factory-primed surfaces and finish coats, touch up finish in conformance with coating Manufacturer's recommendations. Provide touch-up such that repair is not visible from a distance of six (6') feet.

G. Protection: Protect materials, fabrications and assemblies with metal coatings from damage during construction using methods approved by fabricator, galvanizer.

COMPENSATION

Park bench will be measured for payment by the each unit installed, complete in place.

Park bench will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for foundations, anchor bolts and epoxy/grout, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 751.2 SANDY LOAM CUBIC YARD

DESCRIPTION

This work shall consist of furnishing, placing and fine grading of screened sandy loam for lawns in accordance with these specifications and in close conformity with the lines and grades shown on the Drawings or as directed by the Engineer.

This work shall also consist of furnishing approved tested loam for incorporation by Landscaping Subcontractor in planting medium for planting.

Screened sandy loam shall be provided for all seeding under ITEM 765 SEEDING and all tree planting ITEMS 775.01 to 775.12 and shrub planting ITEMS 785.01 to 785.06, as specified, herein.

SUBMITTALS

Samples:

Prior to ordering the below listed materials, submit representative samples to Engineer for selection and approval. Do not order materials until Engineer approval has been obtained. Delivered materials shall closely match the approved samples.

Screened Loam: The Contractor shall provide representative samples for testing and approval. Two (2) test samples of ten pounds (10) each shall be taken and analyzed from each potential screened loam source. Contractor shall deliver samples to testing laboratory, have testing reports

sent directly to the Engineer and pay all cost. Report shall be submitted at least one month before any loam is to be delivered to the site.

- Mechanical and chemical (pH soluble salts) analysis shall be by a public extension service agency or a certified private testing laboratory in accordance with the current "Standards" of the Association of Official Agricultural Chemists. Submit name of testing laboratory for approval.

- Soil Test Report shall include a mechanical sieve analysis with soil classification. Organic content shall be reported. Chemical analysis shall include pH (1:1 soil-water ratio), buffer pH, Soluble Salts (1:2 soil-water ratio), Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Manganese, Ferric Iron and Sulfate.

- Soil test report shall clearly recommend appropriate limestone, fertilizer and other additives required to adjust loam as specified.

MATERIALS

Screened Loam:

Screened loam shall be a "sandy loam" determined by mechanical analysis and based on the "USDA Textural Classification." It shall conform to the following grain size distribution for material passing the #4 sieve:

	Percent Passing by Weight	
U.S. Sieve No.	Maximum	Minimum
4	100	100
40	85	60
100	60	38
200	35	22
.002 mm	5	0

Maximum grain size shall be one and one-quarter inches largest dimension. The maximum retained on the one-quarter inch sieve shall be 20 percent by weight of the total sample. Test shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

Screened loam shall be uncontaminated by salt, water, foreign matter and substances harmful to plant growth. The electrical conductivity (EC^2) of a 1:2 soil-water suspension shall be equal to or less than 1.0 milliohms/cm (test material passing #4 sieve).

Screened loam shall consist of natural topsoil, free from subsoil, obtained from an area which has never been stripped. It shall be removed to a depth of one (1) foot or less if subsoil is encountered. Loam shall be of uniform quality screened free of hard clods, stiff clay, hardpan, sods, partially disintegrated stone, lime, cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, glass, sticks, or any other undesirable material.

Screened loam shall have an acidity range of pH 5.5 to pH 6.5 and shall contain not less than 5% or more than 10% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230º F. plus or minus 9º. To adjust organic matter content, the soil may be amended, prior to site delivery, by the addition of humus. Use of organic amendments is acceptable only if random soil sampling indicates thorough incorporation.

All screened loam shall be provided from offsite sources and shall be brought to the site meeting all specification requirements. There must be no mixing or amending of soil on site. The screened loam must not be handled or moved when in a wet or frozen condition.

To assure screened loam fulfills specified requirements regarding textural analysis, organic matter content, and pH, soil testing results will be obtained by the Contractor and submitted to the Engineer for approval before any soil is delivered to the site.

CONSTRUCTION METHODS

Fine Grading and Loaming For Seeding:

After the areas to be loamed have been brought to grade, and immediately prior to dumping and spreading the screened sandy loam, the subgrade shall be loosened by disking or rototilling to a depth of at least three inches to permit bonding of the loam to the subsoil. Prior to spreading loam remove all stones greater than two (2") inches and all debris or rubbish from the loosened subsoil. Such material shall be removed from the site daily.

Approved screened sandy loam shall be placed and spread over approved areas to a depth sufficiently greater than six (6") inches so that after natural settlement and light rolling the completed work will conform to the lines, grades, and elevation indicated on the Drawings. Supply additional loam, after testing and approval as may be needed, to give the specified depths and finished grades under the Contract without additional cost to the Owner. Loam shall also be free of smaller stones in excessive quantities as determined by the Engineer.

Disturbed areas outside the limit of seeding shall be spread with minimum six (6") inches of approved screened sandy loam to the finished grade.

No subsoil or loam shall be handled in any way if it is in a wet or frozen condition.

Sufficient grade stakes shall be set for checking the finished grades. Grades shall be established which are accurate to one-tenth of a foot either way. Connect contours and spot elevations with an even slope.

The whole surface shall then be rolled with a hand roller weighing not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlements or rolling shall be filled with additional loam and the surface shall be regraded and rolled until it presents a smooth and even finish to the required grade.

Contractor shall obtain Landscape Architect's written approval of fine grading and all bed preparation before proceeding with any seeding.

Screened Sandy Loam for Planting:

Maintain at all times during the planting operations one or more stockpiles of approved loam to be utilized for preparation of planting medium.

METHOD OF MEASUREMENT

The quantity to be paid for this section shall be the quality for the specified item, measured in place by the engineer, completed and accepted.

BASIS OF PAYMENT

The quantity, determined as provided above, will be paid for the contact unit price per cubic yard for the specified item. This would include the cost of furnishing, providing, and installing materials complete in place.

All site preparation and excavation, filling, and rough grading are included for payment in separate pay items.

The placing and fine grading of screened sandy loam for seeding bed preparation shall be for areas to be seeded under ITEM 765 SEEDING shall be included for payment as part of this payment item.

The utilization of loam for all planting medium, within all tree planting ITEMS 775.01 to 775.12 and shrub planting ITEMS 785.01 to 785.06, shall be included for payment as part of this payment item.

ITEM 765. SEEDING SQUARE YARD

DESCRIPTION

This work shall consist of the construction of seed at the lawn areas indicated on the Drawings or as directed by the Landscape Architect, and in accordance with these specifications.

All areas to be seeded shall be inspected by the Contractor before starting work and any defects, such as incorrect grading, drainage problems, etc., shall be reported to the Landscape Architect prior to beginning this work. The commencement of work by the Contractor shall indicate his acceptance of the areas to be seeded, and he shall assume full responsibility for the work of this Section.

All lawns shall be maintained until final written acceptance by the Landscape Architect.

The work under this item shall conform to the relevant provisions of Section 765 of the "Standard Specifications" and the following requirements specified herein.

STANDARDS AND DEFINITIONS

Where references are made in these Specifications to Standard Specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associations, the applicable portions thereof shall govern as fully as if they were recited at length herein. References and standards shall include all revisions thereto issued as of the date of the Notice to Proceed. The following standards and definitions shall apply to the work of this Section.

Standard Specification: Commonwealth of Massachusetts, Massachusetts Highway Authority (MHD now MASSDOT), Standard Specifications for Highways and Bridges, latest edition requirements.

OSHA: Occupational Safety and Health Administration, U.S. Department of Labor, latest requirements.

SUBMITTALS

Samples: Prior to ordering the below listed materials, submit representative samples to Landscape Architect for selection and approval. Do not order materials until Landscape Architect's approval has been obtained. Delivered materials shall closely match the approved samples.

Certificate of Compliance: Submit a manufacturer’s Certificate of Compliance to the Specifications for seed mixes specified.

CERTIFICATE OF ACCEPTANCE

The Landscape Architect will inspect all work upon the written request of the Contractor received at least ten days before the anticipated date of inspection.

Seeded areas shall be maintained until all areas have received a minimum of three mowings, there are no dead areas of grass and the seed is firmly rooted as approved by the Landscape Architect.

Landscape Architect's inspection shall determine if the lawn is acceptable and whether maintenance shall continue in any part.

After all necessary corrective work and clean-up has been completed, the Landscape Architect will certify in writing the acceptance of the lawns. The Contractor's responsibility for maintenance of lawns or parts of lawns shall cease on receipt of the Certificate of Acceptance.

MATERIALS

Sandy Loam shall be as specified under item 751.2, herein.

Soil Additives:

Commercial fertilizer, peat, humus or other additives shall be used to counteract soil deficiencies as recommended by the soil analysis and as directed by the Landscape Architect. Commercial fertilizer shall be a product complying with the State and United States Fertilizer Laws. Deliver to the site in the original unopened containers which shall bear the manufacturer's certificate of compliance covering analysis which shall be furnished to the Landscape Architect. At least 50% by weight of the nitrogen content shall be derived from organic materials. Fertilizer shall contain not less than the percentages of weight of ingredients as follows or as recommended by the soil analysis:

Nitrogen	Phosphorus	Potash
16%	10%	10%

Humus shall be natural humus, reed peat or sedge peat. It shall be free from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form. According to the methods of testing of A.O.A.C., latest edition, the acidity range shall be approximately 5.5 pH to 7.5 pH and the organic matter shall be not less than 85% as determined by loss on ignition. The minimum water absorbing ability shall be 200% by weight on an oven-dry basis.

Limestone: Ground limestone shall be an approved agricultural limestone containing not less than 85% of total calcium or magnesium carbonates. Limestone shall be ground to such fineness that 50% will pass through a 100 mesh sieve and 95% will pass through a 20 mesh sieve.

Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than 18% available phosphoric acid.

Seed:

Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop and in no case shall weed seed content exceed 1% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed, which has become wet, moldy, or otherwise damaged, will not be acceptable.

Lawn seed shall be composed of the following varieties, which shall be mixed in the proportions and shall test to minimum percentages, purity and germination specified.

Sun and Shade Mix	Proportion	Germination Minimum	Purity Minimum
Boreal Red Fescue	30%	85%	95%
Merit Kentucky Bluegrass	25%	90%	90%
Affinity Perennial Ryegrass	28%	90%	90%
Stallion Perennial Ryegrass	17%	90%	90%

Seeding rates shall be 8 pounds per square foot.

Water:

The Contractor shall be responsible for furnishing his own supply of water to the site at no extra cost. Any work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

Erosion Control Matting:

Matting for erosion control shall consist of undyed and unbleached smolder resistant jute yarn woven into a uniform, open, plain weave mesh. Jute matting shall be furnished in rolled strips and shall conform to the following:

Width: 48 inches, plus or minus one inch
78 warp ends per width of cloth
41 weft ends per yard

Weight: To average between 1.22 pounds and 1.80 pounds per linear yard; tolerance plus or minus 5%.

Staples to install the erosion control matting shall be provided by the Manufacturer. The staples shall be made of wire, .091-inches in diameter or greater, "U" shaped with legs 10-inches in length and a 1-1 1/2"-inch crown.

Protection Barriers:

Seeded areas shall be protected by a three foot high barrier constructed of two-by-four stakes or iron pipes set eighteen inches in the ground at ten foot intervals and connected by No. 10 wire. Flags of white cloth shall be secured to the wire at center points between stakes. Barriers must be raised immediately after seeding and shall be maintained until acceptance.

CONSTRUCTION METHODS

Seeding:

Limit of work line shall be the limit of seeding unless otherwise indicated on the Drawings. All areas on the Drawings shall be loamed and seeded only after written approval of the Landscape Architect of bed preparation. All disturbed areas outside the limit of seeding shall be seeded.

Seeding shall be done only during the period from April 1 to May 30 or August 15 to October 15. The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and by accepted practice in this locality. At his option, and on his responsibility, the Contractor may plant seed under unseasonable conditions at no increased cost to the Owner.

Soil additives shall be spread and thoroughly incorporated into the layer of loam spread under 751.2 SANDY LOAM, herein, by harrowing or other methods approved by the Landscape Architect. The following soil additives shall be incorporated:

- Spread ground limestone as required by soil analysis to achieve a pH of 6 to 6.5, but the maximum amount applied shall be one (1) pound per square yard.
- Spread fertilizer at the rate of forty (40) pounds per one thousand (1000) square feet or more as required by soil analysis.
- Spread Superphosphate at the rate of twenty (20) pounds per one thousand (1000) square feet.
- Incorporate humus as required by soil analysis prior to delivery to site. Contractor shall have loam retested with organic matter incorporated and shall obtain approval prior to bringing any loam on the site.

Seeding of lawns shall be done only by experienced workmen under the supervision of a qualified foreman. Seeding shall consist of soil preparation, seeding, rolling, weeding, watering and otherwise providing all labor and materials necessary to secure the establishment of acceptable turf.

Seed only when the bed is in a friable condition, not muddy or hard.

Seeding shall be done in two directions at right angels to each other. Sow the deed with an approved seeding device at the rate of ten pounds per 1000 square feet. No seeding shall be done in windy weather.

If covering and rolling is not properly accomplished by the seeding machine, the seed shall be lightly raked into the ground, after which the ground shall be rolled with a five hundred pound roller and thoroughly and evenly watered with a fine spray to penetrate the soil to a depth of at least two inches.

Erosion control matting shall be installed according to Manufacturer's specifications in all drainage swales and all slopes of one vertical foot to three horizontal, or steeper, immediately after such areas have been seeded.

Maintenance and Protection:

Maintenance shall begin immediately after any area is seeded and shall continue until acceptance.

Maintenance shall include reseeding, mowing, watering, weeding and fertilizing.

Watering of Seeded Areas:

First Week: The Contractor shall provide all labor and arrange for all watering necessary for rooting of the seed. In the absence of an adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantities to maintain moist soil to a depth of at least three inches. Watering should be done during the heat of the day to help prevent wilting.

Second and Subsequent Weeks: The Contractor shall water the lawn as required to maintain adequate moisture, until final acceptance, in the upper three inches of soil, necessary for the promotion of deep root growth.

Watering shall be done in a manner which will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment. The Contractor shall furnish sufficient watering equipment to apply one complete coverage to the seeded areas in an eight (8) hour period.

Protection:

Seeded areas shall be protected by a three foot high barrier, which shall be raised immediately after seeding and shall be maintained until acceptance.

Mowing:

The first mowing of seeded areas shall not be attempted until the seed is firmly rooted and secure in place. Not more than 40% of the grass leaf shall be removed by the initial or subsequent mowings. Grass height shall be maintained between 2 and 2-1/2 inches unless otherwise specified. Thereafter grass shall be maintained at two inches until written acceptance by the Landscape Architect. Mowing shall include removal of clippings.

Fertilizing:

A second application of fertilizer, as specified herein, shall be applied by the Contractor after one (1) season of growth of a minimum of two (2) months duration only during the months of April, May, August or September. Fertilizer shall be applied at the rate of thirty (30) pounds per one thousand (1,000) square feet. Additional limestone applications as required by the soils analysis to bring the pH levels of the screened sandy loam to the specified range shall be the full responsibilities of the Contractor.

METHOD OF MEASUREMENT

The quantity of seeding shall be the number of square yards based on actual measurements made over the general contour of the areas seeded, complete in place and accepted as specified, including all guarantees. The Sandy Loam shall be paid for under Item 751.2, herein.

BASIS OF PAYMENT

The Seeding quantity, determined as provided above, will be paid for at the contract price per square yard. Such price and payment shall be full compensation for all the work and materials required and specified under these Items to install each item complete in place.

ITEM 767.12 COMPOST FILTER TUBE FOOT

The purpose of this item is to provide a linear, compost-filled tube for filtering suspended sediments from storm water flow. This item shall conform to the requirements of Section 751 and 767 of the Standard Specifications and the following.

MATERIALS

Material for the filter tubes shall be compost meeting M1.06.0, except that no manure or bio-solids shall be used. In addition, no kiln-dried wood or construction debris shall be allowed. Compost shall pass through a 3 inch sieve.

Tubes for compost filters shall be a minimum of 12 inches maximum of 18" in diameter, and shall be jute mesh or approved biodegradable material. Additional tubes shall be used at the direction of the Engineer. Stakes for anchors, if required, shall be nominal 2x2 stakes.

CONSTRUCTION

Tubes of compost may be filled on site or shipped. Tubes shall be placed, filled and staked in place as required to ensure stability against water flows. All tubes shall be tamped to ensure good contact with soil.

The Contractor shall ensure that the filter tubes function as intended at all times. Tubes shall be inspected after each rainfall and at least daily during prolonged rainfall. The Contractor shall immediately correct all deficiencies, including, but not limited to, washout, overtopping, clogging due to sediment, and erosion. The contractor shall review location of tubes in areas where construction activity causes drainage runoff to ensure that the tubes are properly located for effectiveness. Where deficiencies exist, such as overtopping or wash-out, additional staking or compost material shall be installed as directed by the Engineer. Contractor shall remove sediment deposits as necessary to maintain the filters in working condition.

Filter tubes shall be removed by the Contractor when site conditions are sufficiently stable to prevent surface erosion, and after receiving permission to do so from the Engineer. All tube fabric shall be cut and removed and disposed of off-site by the Contractor. At the direction of

the Engineer, the Contractor may rake out and seed mulch material so that it is no greater than 2 inches in depth on soil substrate.

METHOD OF MEASUREMENT

Compost filter tubes will be measured for payment per foot, complete in place.

BASIS OF PAYMENT

Compost filter tubes will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for required overlapping tubes, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 775.01	**ACER X FREEMANI 'ARMSTRONG' 3.5-4" CAL.**	**EACH**
ITEM 775.02	**ACER RUBRUM 4.5-5" CAL.**	**EACH**
ITEM 775.03	**ACER RUBRUM 3-3.5" CAL.**	**EACH**
ITEM 775.04	**AMELANCHIER X 'AUTUMN BRILLIANCE' 3-3.5" CAL.**	**EACH**
ITEM 775.05	**CORNUS ALTERNIFOLIA 7-8' HT. (TREE FORM)**	**EACH**
ITEM 775.06	**CLADRASTIS LUTEA4.5-5" CAL.**	**EACH**
ITEM 775.07	**CORNUS MAS 6'-7' HT. (TREE FORM)**	**EACH**
ITEM 775.08	**NYSSA SILVATICA 3.5-4" CAL.**	**EACH**
ITEM 775.09	**QUERCUS BICOLOR 4.5-5" CAL.**	**EACH**
ITEM 775.10	**QUERCUS PALUSTRIS 4.5-5" CAL.**	**EACH**
ITEM 775.11	**QUERCUS RUBRA 4.5-5" CAL.**	**EACH**
ITEM 775.12	**QUERCUS RUBRA 3-3.5" CAL.**	**EACH**
ITEM 785.01	**CLETHRA ALNIFOLIA 'HUMMINGBIRD'2-3' HT.**	**EACH**
ITEM 785.02	**CORNUS RACEMOSA 3-4' HT.**	**EACH**
ITEM 785.03	**CORNUS SERICEA 3-4' HT.**	**EACH**
ITEM 785.04	**RHUS AROMATICA 'GRO-LOW' 2-3' HT.**	**EACH**
ITEM 785.05	**VIBURNUM CASSANOIDES 4-5' HT.**	**EACH**
ITEM 785.06	**VIBURNUM DENTATUM 4-5' HT.**	**EACH**

DESCRIPTION

This work of this Section shall consist of furnishing, planting of trees and shrubs of varieties and sizes specified and maintaining them in locations as shown on the Drawings and/or as directed by the Engineer.

This work shall include providing all approved materials required to complete the work, excavation of tree pits and shrub planting beds, mixing and placing of growing medium, mulching, watering, fertilizing, maintenance of plants and replacement of unsatisfactory or dead plants during the life of the contract and in accordance with the guarantee period.

All areas to be planted shall be inspected by the Contractor before starting work and any defects, such as incorrect grading, etc., shall be reported to the Engineer prior to beginning this work.

The commencement of work by the Contractor shall indicate his acceptance of the areas to be planted, and he shall assume full responsibility for the work of this item.

The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining trees and shrubs temporarily and/or rehandling trees and shrubs prior to final installation.

The sum of 10% of the total cost of the planting contract shall be retained and paid to the Contractor after replacements have been made, one year from the date of acceptance of original planting.

Contractor shall schedule tree selection and digging operations so as to comply with nursery industry recognition of 'Spring Dig Only' or 'Fall Hazard' plant materials. No substitutions of plant materials will be allowed for fall planting based on unavailability due to the 'Spring Dig Only' or 'Fall Hazard' restrictions. Contractor and Landscape Architect shall have selected and had the material dug during the previous spring or fall.

Contractor shall verify all utility conditions and elevations prior to work. Before construction starts, all utility companies both public and private must be contacted, including those in control of utilities not shown on this plan. See Chapter 370 Acts of 1963 Massachusetts and contact "DIG SAFE" 1-888-344-7233, or www.digsafe.com. Report any discrepancies in writing to the Engineer and receive written instructions prior to proceeding.

The work under this item shall conform to the relevant provisions of Section 771 of the "Standard Specifications" and the following requirements specified herein.

STANDARDS AND DEFINITIONS

Where references are made in these Specifications to Standard Specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associations, the applicable portions thereof shall govern as fully as if they were recited at length herein. References and standards shall include all revisions thereto issued as of the date of the Notice to Proceed. The following standards and definitions shall apply to the work of this Section.

Standard Specification: Commonwealth of Massachusetts, Massachusetts Highway Authority (MHD now MASSDOT), Standard Specifications for Highways and Bridges, latest edition requirements.

ASNS: "American Standard for Nursery Stock", ANSI 260.1, latest edition, published by the American Association of Nurserymen, (AAN)

SPN: "Standardized Plant Names", latest edition, by the American Joint Committee on Horticulture Nomenclature.

AOAC: Association of Official Agricultural Chemists

ANSI: "American National Standard Institute, Inc. "Standards for Tree Care Operations Tree Shrub and Other Woody Plant Maintenance" ANSI A300.

USDA: United States Department of Agriculture, USDA Plant Hardiness Zone Map; USDA Miscellaneous Publication No. 1475; issued January 1990, or latest edition

OSHA: Occupational Safety and Health Administration, U.S. Department of Labor, latest requirements.

SAMPLES AND SUBMITTALS

Prior to ordering the below listed materials, submit representative samples to the Owner for selection and approval at least thirty- (30) days prior to the start of work under this Section, as follows. Do not order materials until Owner's approval has been obtained. Delivered materials shall closely match the approved samples.

- Plant Material: The Contractor shall provide written certification as to source of plant material and species/cultivars to be supplied.

- Fertilizer: Submit product literature of planting fertilizer for all plantings and certificates showing composition and analysis. Submit fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations as described in this Section.

- Planting Mulch: Submit a one (1) cubic foot sample.

- Antidessicant: Submit product literature

- Soil Additives: Submit test results and product literature for all Soil additives required to the work - humus, reed peat, sedge peat, sand, etc. and submit certificates showing composition and analysis for each additive

- Materials for staking trees: Submit product literature for all materials required to complete the work.

Schedule: Contractor shall submit a Schedule for Planting to the Landscape Architect for approval. Contractor shall schedule tree selection and digging operations so as to comply with nursery industry recognition of 'Spring Dig Only' or 'Fall Hazard' plant materials. If required the schedule shall show selection of the material dug during the previous spring or fall.

Water Supply Method and Schedule: Submit the proposed methods of providing a water source and the schedule for watering for new plantings during the specified construction establishment/maintenance period for approval by the Landscape Architect.

Test results from testing of plant materials for disease or pests: Submit results report.

Disease and pest controls: Submit test results and product literature for the recommended treatment. All use of chemicals shall be approved by the Landscape Architect.

Licenses: Submit proof of licensure by the Massachusetts Department of Food and Agriculture for all chemical and pesticide applicators to be employed on the Project for approval by the Landscape Architect.

MSDS Submittals: Submit Material Safety Data Sheets (MSDS) of all chemicals to be applied on the Project for approval by the Landscape Architect.

Landscape Contractor/Subcontractor Submittal: Submit the company/firm description to be employed on this project for planting and the resume for the Project Supervisor to be employed on the Project for approval by the Landscape Architect at least thirty- (30) days prior to the start of work under this Section. The company/firm description shall include a minimum of five (5) projects of similar scale and complexity constructed by the company and a reference for each project including name, position, and telephone number for each reference for each project.

Arborist Certification(s) Submittal: Submit proof of certification as a Massachusetts Certified Arborist for all arborists to be employed on the Project for approval by the Landscape Architect at least thirty- (30) days prior to the start of work under this Section.

CERTIFICATE OF ACCEPTANCE AND GUARANTEE

After the minimum ninety (90) day maintenance period, the Contractor shall request the Engineer, in writing, for an inspection to determine whether the plant material is acceptable. If the plant material and workmanship are acceptable, written notice will be given by the Engineer to the Contractor stating that the two (2) year guarantee period begins from the date of the Certificate of Acceptance.

If a substantial number of plants are sickly or dead at the time of inspection, acceptance will not be granted, and the Contractor's responsibility for maintenance of all plants shall be extended until replacements are made. All dead and unsatisfactory plants shall be promptly removed from the project. Replacements shall conform in all respects to the specifications for new plants and shall be planted in the same manner.

Plants shall be guaranteed for a period of two (2) years after Certificate of Acceptance and shall be alive and in satisfactory growth at the end of the guarantee period. Each plant shall show at least 95% healthy growth and shall have the natural character of a plant of its species in accordance with the American Nurserymen's Association Standards. The sum of 10% of the total cost of the planting contract shall be retained and paid to the Contractor after replacements have been made, two years from the date of acceptance of original planting.

At the end of the two (2) year guarantee period, inspection will be made again. Any plant required under this contract that is dead or unsatisfactory shall be removed promptly from the site and replaced in kind. Each plant shall show at least 95% healthy growth and shall have the natural character of a plant of its species in accordance with the American Nurserymen's Association Standards. Dead or unsatisfactory plants shall be replaced during the normal planting season, repeatedly, if necessary, until the plants live through two (2) years. A final

inspection for acceptance will be made after the replacements have lived through an additional one (1) year.

All replacements shall be plants of the same kind and size specified in the PLANT LIST and they shall be planted in the same manner. The cost shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.

MATERIALS

Screened Sandy Loam shall be as specified under Item 751.2, herein.

Soil Additives:

Fertilizer for amending loam to meet test laboratory requirements for the particular type of planting to be done shall be a non-phytotoxic biostimulant formulated to promote raid root growth and regeneration. It shall be derived from organic composts and humus extracts and shall be compatible with fertilizers, herbicides, pesticides, fungicides and absorbent gels. Material shall be Root2, a product of LISA Products Corporation, (800)342-6173 or approved equal.

In addition to the soil amendment required above, fertilizer shall be provided for each tree through the use of slow-release fertilizer packets, packaged in plastic sacks with micropore holes which provide for a controlled release of nutrients gradually over a minimum eight year period.

Each packet shall consist of four ounces of water soluble fertilizer with a minimum guaranteed analysis of available elements as follows:

Nitrogen	16%
Phosphoric Acid	8%
Potash	16%

Fertilizer packets may be obtained from A.D.C.O. Works, P.O. Box 310, Hollis, NY 00423, telephone (718) 739-0701, or from Unique Fertilizers Inc., P.O. Box 99, Deptford, NJ 08096, telephone (609) 848-4444, or approved equal.

Humus shall be natural humus, reed peat or sedge peat. It shall be free from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form. According to the methods of testing of A.O.A.C., latest edition, the acidity range shall be approximately 5.5 pH to 7.5 pH and the organic matter shall be not less than 85% as determined by loss on ignition. The minimum water absorbing ability shall be 200% by weight on an oven-dry basis.

Peat moss shall be composed of the partly decomposed stems or leaves of any of several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue and other foreign materials. It shall have an acidity range of 4.5 pH to 6.5 pH as determined in accordance with the methods of testing of A.O.A.C., latest edition. Its water absorbing ability shall be a minimum of 1,100% by weight on an oven-dry basis.

Manure shall be well-rotted, unleached stable manure not less than eight months and not more than two years old. It shall be free from sawdust, shavings or refuse of any kind and shall not contain over twenty-five percent straw. The Contractor shall furnish information as to the kind of disinfectant or chemicals, if any, that may have been used in storage of the manure.

Bone meal shall be fine ground, steam cooked, packing house bone with a minimum analysis of 23% phosphoric acid and 4% nitrogen.

Lime: An acceptable dolomite limestone containing not less than 85% of total carbonates, ground so that 50% will pass a 100 mesh sieve and 90% will pass a 20 mesh sieve.

Aluminum Sulfate: Unadulterated, 57% manufactured by Ortho Division, Chevron Chemical Company, or approved equal.

Plant Materials:

The Contractor shall furnish and plant all plants shown on the Drawings, as specified, and in quantities, sizes and varieties as shown on the PLANT LIST. No substitutions will be permitted. All plants shall be nursery grown unless specifically authorized to be collected. The Contractor shall provide written certification as to the source of plant material and species/cultivars to be supplied.

A complete list of plants, including a schedule of sizes, quantities and other requirements, shall be shown on the Drawings. In the event that quantity discrepancies or material omissions occur between the plant materials list and the Drawings, the higher number of plants shall govern.

Plants shall be in accordance with the USA Standard for Nursery Stock of the American Association of Nurserymen, latest edition.

All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. Only plant stock grown within the hardiness Zones 1 through 5, as established by the Arnold Arboretum, Jamaica Plain, Massachusetts, will be accepted. The Contractor's suppliers must certify in writing that the stock has actually been grown under Zone 5 or hardier conditions. Plants not so certified will not be accepted.

The root system of each plant shall be well provided with fibrous roots. All parts shall be sound, healthy, and vigorous, well-branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs or larvae.

All plant roots and earth balls or containers must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation and on the ground until the final planting. The plants shall be planted in the center of the holes and at the same depth as they previously grew. All trees shall have their north side marked at the nursery and shall be planted with the north side facing north on the site, unless directed differently by the Landscape Architect in the field.

All plants must be moved with the root systems as solid units with balls of earth firmly wrapped with untreated eight ounce burlap, firmly held in place by a stout cord or wire. The diameter and

depth of the balls of earth must be sufficient to encompass the fibrous root feeding system necessary for the healthy development of the plant. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during the process of planting or after the burlap, staves, ropes or platform required in connection with its transplanting have been removed. The plants and root balls shall remain intact during all operations. All plants shall be planted within twenty-four (24) hours of delivery to the site. Plants that cannot be planted within twenty-four (24) hours shall be removed from the site.

The height of trees (measured from the crown of the roots to the tip of the top branch) shall not be less than the minimum size designated. Take caliper measurement six (6") inches above ground level up to and including four inch caliper size and twelve inches above the ground for larger sizes. The trunk of each tree shall be a single trunk growing from a single unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sun scald, frost cracks, or wounds resulting from abrasions, fire and other causes. No pruning wounds shall be present having a diameter exceeding two inches and such wounds must show vigorous bark on all edges. Plants shall not be pruned prior to delivery.

Plants delivered by truck shall be properly wrapped and covered to prevent wind-drying and desiccation of branches, leaves or buds; plant balls shall be firmly bound, unbroken, reasonably moist to indicate watering prior to delivery and during storage; and tree trunks shall be free from fresh scars and damage in handling. No trees with double leaders or twin heads will be acceptable without the written approval of the Landscape Architect. The Contractor shall reject such plants at the time of delivery by the nursery. No plant material from cold storage will be accepted.

Staking of Trees:

Stakes for supporting trees shall be galvanized steel pipe painted black. Stakes shall have a minimum outside diameter of 2-1/2" inches nominal length as shown on the Drawings or as required to complete the work.

Hose shall be new two-ply fibber bearing garden hose, not less than one-half (1/2") inside diameter, twelve (12") inches long, and color shall be black.

Wire for guying plants shall be new pliable annealed galvanized steel wire; A.S. & W. twelve gauge or gauge as shown on the Drawings.

The size and quality of cables, turnbuckles, thimbles, leg hooks, eyebolts, rods, and all required hardware shall be galvanized and shall be as shown on the approved Shop Drawings.

Guy webbing can be substituted for steel wire and shall be a woven soft polypropylene material with a weave that ensures a rounded edge at all times. It shall have 900-pound test strength and shall expand as the tree grows. Color (white or olive green) shall be selected by the Landscape Architect.

Water:

The Contractor shall be responsible for furnishing his own supply of water to the site at no extra cost. Any work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

Antidesiccants:

Antidesiccants shall be emulsions or other materials which will provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for the purpose. Manufacturer of antidesiccant shall be subject to the Landscape Architect's approval and shall be used only after approval of the Landscape Architect.

CONSTRUCTION METHODS

Furnishing and planting of any plant material includes the digging of the holes, provisions of soil additives and loam, furnishing the plants of specified size with roots in the specified manner, construction of treeways, and aeration pipe system as shown on the Drawings, and the labor of planting and mulching where called for.

Seasons for Planting:

Spring: Deciduous materials - March 21 through May 1.
Fall: Deciduous materials - October 1 through December 1.

Contractor shall schedule tree selection and digging operations so as to comply with nursery industry recognition of 'Spring Dig Only' plant materials. No substitutions of plant materials will be allowed for fall planting based on unavailability due to the 'Spring Dig Only' restrictions. Contractor shall have selected and had the material dug during the previous spring.

Planting Medium:

Screened Sandy Loam shall be as specified under Item 751.2, herein. The loam proposed for use shall be tested prior to use, and improved as necessary to satisfy specification requirements, in accordance to the testing laboratory's recommendations. No planting soil mix may be used to install trees or shrubs until laboratory tests have been reviewed and approved by the Landscape Architect.

Screened loam, organic material and bonemeal for planting medium for backfill for both planting beds and individual plants shall be thoroughly premixed in the proportions of one part of organic material with seven parts of loam together with ten (10) pounds of bonemeal per cubic yard of mixture. All materials for planting medium shall be approved prior to any material being brought on to the site.

Planting medium for backfill mix for shrub planting beds shall be prepared with the materials as specified above to a minimum depth of twenty-four inches (24") or as shown on the Drawings.

Planting :

All plant locations shall be staked out on the ground and the locations must be approved by the Landscape Architect before any excavation is started. If it is necessary to adjust any of the locations, because of unforeseen problems, the changes shall be under the direct supervision of the Engineer and there shall be no extra charges for these adjustments. For tree pits in medians, or adjacent to sidewalks or road pavement locations the Contractor shall have tree pit locations checked with Dig Safe for utility conflicts before any excavation commences.

At least twenty (20) days prior to the expected date, the Contractor shall request, in writing, that the Engineer provide a representative to select and tag all stock to be planted under this Section. The Contractor shall arrange for and bear the cost of transportation, meals in transit, and overnight accommodations, if necessary, for the Landscape Architect during the period of time required to select and tag the required number of sized stock. The letter of request shall also have attached a letter of certification from the supplier attesting to the fact that the stock sources to be selected from do, in fact include, the particular plant material required under this Section.

Plants shall be selected and tagged by the Landscape Architect at the place of growth for conformity to specification requirements as to quality, size, and variety. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work. Cost of replacements shall be borne by the Contractor.

Maintain at all times during the planting operations one or more stockpiles of approved pre-mixed planting medium.

Plant pits shall be excavated with vertical sides. Holes for trees shall be at least three (3') feet greater than the ball and six (6') six inches deeper than the ball. All trees shall be planted at the same grade that they grew in the nursery and shall be placed so that the nursery marked north side faces north on site unless directed differently by the Landscape Architect in the field. Contractor shall locate the union of root and trunk on each plant prior to digging the whole in order to determine depth of whole required.

All shrubs shall be planted in a continuous bed and shall be at least eighteen inches (18") greater than the ball and at least six inches (6") deeper than the ball. Contractor shall locate the union of root and trunk on each plant prior to digging the hole in order to determine depth of hole required.

Balled and burlapped plants shall be handled so that the ball will not be loosened. After the soil has been thoroughly firmed under and around the ball, the burlap shall be cut away from the upper half of the ball, and the remaining burlap adjusted to prevent the formation of air pockets. Where directed by the Landscape Architect, the burlap shall be entirely removed.

Any plants brought to the site with plastic or synthetic fabric shall be rejected and shall be removed from the site within twenty-four (24) hours

The planting pit shall be backfilled with planting soil mix in layers not to exceed six (6") inches. Each layer is to be firmly tamped. When the pit is approximately 2/3 full, thoroughly water, do not puddle mix but allow water to drain thoroughly undisturbed. Continue backfilling and tamping in eight inch (8") layers until planting level is at the level the plant was grown. Water thoroughly and adjust soil level. Form a six (6") earth saucer around each planting pit.

At the time of planting, install fertilizer packets at a depth of six to eight inches (6”-8”) equally spaced around the plant as it is being backfilled. Packets shall be placed approximately three inches (3”) away from the plants roots or plant ball. Packets shall not be cut, ripped, or damaged. If it becomes necessary to remove and replace dead or unhealthy plants, any damaged or broken packets shall be replaced with new packets. The application rates for fertilizer packets shall be as follows:

Type of Plant	Rate
Deciduous Shade Tree	One packet for each inch of caliper
Small Flowering Trees	One packet for each eighteen inches (18”) of height
Shrubs	One packet for each twelve inches (12”) of height or spread.

All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation and on the ground until the final planting. The plants shall be planted in the center of the holes and at the same depth as they previously grew.

All plants shall be flooded with water twice within the first twenty-four hours of the time of planting and all plants during the maintenance period shall be watered at least twice each week unless sufficient rainfall has occurred. At each watering the soil around each tree shall be thoroughly saturated. If sufficient moisture is retained in the soil, as determined by the Owner, the required watering may be reduced. Trees will require a minimum of ten (10) gallons of water each week and shrubs will require a minimum of five (5) gallons of water each week.

Contractor shall notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

In the event that rock or underground construction work or obstructions are encountered in any plant pit or bed excavation work to be done under this contract, alternate locations may be selected by the Landscape Architect.

If planting is done after lawn preparation or installation, proper protection of lawn areas shall be provided and any damage resulting from planting operations shall be repaired immediately at no cost to the Owner.

Absolutely no debris may be left on the site. Excavated material shall be removed as directed by the Landscape Architect. Repair any damage to site or structures to restore them to their original condition as directed by the Landscape Architect at no cost to the Owner.

Mulching:

Mulch shall be placed over a maximum of twelve (12”) inches in diameter off the tree trunk for individual trees and over the entire area of shrub and/or groundcover planting beds to a depth of two inches after settlement not later than one week after planting. Submit sample for approval.

No mulch shall be applied prior to the first watering of plant materials. NO MULCH SHALL EVER BE MOUNDED LIKE A VOLCANO. Mulch shall always lie flat on the ground. Keep mulch away from stem(s) of plant. Leave a minimum of three (3") inches of exposed soil around the trunk. Trunk flare shall be visible.

Pruning:

Each tree shall be pruned in accordance with the National Arborists Association Standards to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed. Never cut a leader.

Tree pruning shall be undertaken to the full height of affected trees. Street trees shall be pruned to meet A.D.A. requirements, and as directed by the Landscape Architect. Trees in medians overhanging roadways shall be pruned as directed by Landscape Architect to avoid interference with passing vehicles.

In the event that rock or underground construction work or obstructions are encountered in any plant pit or planting bed, alternate locations shall be selected by the Owner.

Absolutely no debris may be left on the site. Excavated material shall be removed as directed by the Engineer. Repair any damage to site or structures to restore them to their original condition at no additional cost to the Owner.

Maintenance:

Maintenance shall begin immediately after each plant is substantially accepted in writing by the Engineer and shall continue for a minimum of ninety (90) days or until the final written acceptance of all planting is issued by the Engineer.

Maintenance shall consist of keeping the plants in a healthy growing condition and shall include watering, weeding, cultivating, removal of dead material, resetting plants to proper grades or upright position, and maintaining the protection fence for new plantings. Seasonal spraying for insects or disease shall also be included as required and/or as directed by Owner.

Plants that die during the maintenance period shall be removed and replaced at once, unless designated otherwise by the Landscape Architect. Unacceptable and dead plants, as determined by the Landscape Architect, shall be removed by the Contractor immediately upon written notice, regardless of whether the time period is the appropriate season for plant material replacement.

During the maintenance period, any decline in the condition of plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturists to inspect plant materials and to identify problems and recommend corrective procedures.

METHOD OF MEASUREMENT

The quantity to be paid for these Items shall be per each and shall include all items required to install each plant in place, including preparation of planting medium, mixing of structural soil material, maintenance etc. complete and accepted as specified, including all guarantees. The Screened Sandy Loam shall be paid for under Items 751.2, herein.

BASIS OF PAYMENT

The quantity, determined as provided above, will be paid for at the contract price for each item. Such price and payment shall be full compensation for all the work and materials required and specified under these Items to install each item complete in place.

ITEM 804.2	**2" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL)**	**FOOT**
ITEM 804.3	**3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL)**	**FOOT**
ITEM 804.3D	**3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL)-DOUBLE**	**FOOT**
ITEM 804.3T	**3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL)-TRIPLE**	**FOOT**

GENERAL

The work under these items shall conform to the relevant provisions of Section 801 of the Standard Specifications and the following:

The work shall include furnishing and the installation of non-metallic conduit, underground warning tape, replacement of gravel, concrete and pavement, in accordance with the plans, specifications, and as directed by the Engineer. Double 3" conduit trenches (traffic signal, interconnection cable, and/or street lighting) shall be paid for per foot, under item 804.3D. Triple 3" conduit trenches (traffic signal, interconnection cable, and Street lighting) shall be paid for per foot, under item 804.3T

Submittals

Submittals for conduit shall be made in a timely fashion including all manufactures data sheets, and shop drawings, as applicable, and specified herein.

MATERIALS

The conduit material shall be Schedule 80 polyvinyl chloride (PVC) plastic conduit.

Underground warning tape shall be permanent, bright-colored, continuous-printed, vinyl tape, not less than 6" wide by 5 mils thick. Tape shall be compounded for permanent direct-burial service and embedded with a continuous metallic strip or core. Tape shall have a printed legend that indicates type of underground line with color conforming to the latest American Public Works Association (APWA) Uniform Color Code. Tape shall conform to the specifications of OSHA Regulation 1926-956 and the DOT Office of Pipeline Safety USAS B31.8. Manufacturer's data for underground warning tape shall be submitted with conduit submittal.

CONSTRUCTION

Underground Warning Tape shall be installed within 12" of finished grade.

No separate payment will be made for the underground warning tape, but all costs in connection therewith shall be included in the linear price bid

Where conduit is installed in existing sidewalk, roadway not subject to overlay or paved median areas to remain, the work shall include replacement of the gravel base material and the surface pavement to match pre-construction conditions. No separate payment will be made for this work, but all costs in connection therewith shall be included in the linear price bid.

Conduit Crossing Roadways

Trenches in existing bituminous concrete pavement not subject to full depth reconstruction shall be saw cut to the width indicated on the contract drawings. The existing pavements shall be saw cut through their full depth and the pavement removed. Conduit shall be encased in high early strength concrete.

No separate payment will be made for the saw cutting, gravel borrow, high early strength concrete, or pavement, but all costs in connection therewith shall be included in the unit price bid.

BASIS OF PAYMENT

The unit contract price per foot shall be full compensation for furnishing all conduits, condulets, couplings, elbows, fittings, field bends, caps, joint compound, cement concrete, gravel, saw cutting, concrete for conduit encasement and sidewalk, underground warning tape in accordance with these specifications, standard specifications, Contract Drawings, and as directed by the Engineer, including all excavation (including hand excavation where indicated on the drawings), backfilling of the trenches, surface restoration, all equipment, tools, labor, and all other work incidental to the construction of the conduits for the lighting system. The excavation of the 7"± concrete slab under the Route 9 asphalt shall be paid for seperately under Item 121.1.

ITEM 811.22 STREETLIGHTING ELECTRIC HANDHOLE – SD2.022 EACH

GENERAL

The work under these items shall conform to the relevant provisions of Section 801 of the Standard Specifications and the following:

The work shall include furnishing and the installation of electric handholes, frames, covers, and grounding for the lighting system in accordance with the plans, specifications, and as directed by the Engineer.

Submittals

Submittals for concrete handhole and cast iron frame & cover shall be made in a timely fashion including all manufactures data sheets, and shop drawings, as applicable, and specified herein.

MATERIALS

Material for handholes shall meet the requirements specified in Section 801 of the Standard Specifications.

Handhole frames and covers shall be cast iron as specified in Subsection M8 of Division III, Materials. Handhole frame shall be provided with drilled and threaded hole for connection of grounding conductor.

Provide exterior handling anchors for lifting and setting handholes.

Handhole cover shall be provided with safety tread or diamond surface design. Cover shall be labeled "Brookline Lighting" with 1" letters permanently engraved into the surface of the cover.

CONSTRUCTION

Handholes, handhole covers and frames shall be designed to support AASHTO H20 loading.

Confirm with Brookline Site Engineer as to final surface elevation when setting

Handholes shall be provided with frames, covers, pull irons, grounding wire, grounding bushings, conduit end bells, grounding connections, as shown on the Contract Drawings and in accordance with the applicable requirements of Section 801.

Provide brick and mortar between precast concrete handhole and cast iron frame as detailed on the drawings.

Ground conductor shall be exothermically welded to the handhole cover and connected to the frame with a split bolt connector.

Surface Restoration

Where handholes are installed in existing sidewalk or roadway, the work shall include replacement of the gravel base material and the surface pavement. No separate payment will be made for this work, but all costs in connection therewith shall be included in per each price bid.

METHOD OF MEASUREMENT

The work of this section shall be measured by each handhole provided by the Contractor complete in place, and approved by the Engineer.

BASIS OF PAYMENT

Payment for each handhole will be paid at the contract unit price, complete, accepted in place, which price shall include full compensation for all materials, concrete, reinforcing steel, form work, excavation, backfill, gravel sub-base, bricks, mortar, surface restoration, saw cutting, handhole, handhole cover and frame, grounding conductor within handhole, grounding connections, grounding bushings, ground connection to handhole cover and frame conduit end bells, pull irons, and all equipment, tools, labor and work incidental thereto.

ITEM 811.32 HANDHOLE 12 X 24 INCHES – BTD STANDARD EACH

The work under these items shall conform to the relevant provisions of Section 801 of the Standard Specifications, the Boston Transportation Department Construction Standard Details and the following:

The work shall consist of furnishing 12-inch X 24-inch electrical handholes for electrical connections as shown on the plans. The handhole shall be in conformance with Boston Transportation Department's Traffic Signal Standard Plan A8.1 – "12"X24" CAST IRON HANDHOLE FRAME & CAST IRON COVER" dated 01/04/00 and A40 – "12"X24" PRECAST CONCRETE HAND HOLE" dated 3/11/98. All handholes proposed in the driveway or roadway must be installed with heavy-duty frame and cover, capable of sustaining loading of H-20 or better in conformance with the Standard Specifications for Highways and Bridges, at no additional cost. The cost to sawcut existing sidewalk, and to repair and/or replace damaged sidewalk and pavement surfaces shall be incidental to this item. The handholes installed within the limits of the Town of Brookline shall read "Brookline Traffic" on the cover with 1" letters permanently engraved into the surface.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Handhole 12 X 24 inches – BTD standard willtbe measured and paid for at the Contract unit price per Each, which price shall include labor, materials, equipment and incidental costs required to complete the work.

ITEM 812.101 LIGHT STANDARD FOUNDATION – PRE-CAST EACH

GENERAL

The work to be done under these items consists of furnishing and installing light standard foundations, and light standard foundation caps in accordance with the Standard Specifications, Contract Drawings, and as hereinafter specified.

Submittals

Submittals for light standard foundations shall be made in a timely fashion including all manufactures data sheets, and shop drawings, as applicable, and specified herein.

MATERIALS

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Cement and Cement Concrete Materials	M4
Metals and related Materials	M8
Gravel	M1.03.0,Type c

CONSTRUCTION

Light standard foundations shall be provided with the anchor bolts, reinforcing rods, conduit sweeps, as shown on the Contract Drawings and in accordance with the applicable requirements of Section 901 Cement Concrete Masonry and Section 801.62 Foundations.

The contractor shall take all precautions not to cause any harm to the existing utilities during all phases of construction. The contractor shall provide temporary sheeting as required to protect adjacent roadway, utilities, or property.

Confirm with Brookline Site Engineer as to final surface elevation when setting.

Provide exterior handling anchors for lifting and setting Foundation

Surface Restoration

Where light standard foundations are installed in existing sidewalk, the work shall include replacement of the gravel base material and the surface pavement to match pre-construction conditions. No separate payment will be made for this work, but all costs in connection therewith shall be included in per each price bid.

METHOD OF MEASUREMENT

The work of this section shall be measured by each Light Standard Foundation provided by the Contractor, complete in place, and approved by the Engineer.

BASIS OF PAYMENT

Payment for each Light Standard Foundations will be paid at the contract unit price, complete, and accepted in place, which price shall include full compensation for all materials, reinforcing rods, anchor bolts, concrete, form work, excavation, backfill, surface restoration, temporary sheeting, gravel sub-base, dewatering, and all equipment, tools, labor and work incidental thereto.

ITEM 816.01 TRAFFIC SIGNAL RECONSTRUCTION LUMP SUM
LOCATION NO. 1

SCOPE OF TRAFFIC SIGNAL WORK

The work to be done under this item consists of furnishing and the installation of a new traffic control signal system, complete with signal posts, signal heads, mast arm assemblies, controller, cabinet, foundations, wire and cable, system loop detection, video detection system, emergency vehicle preemption system, signal interconnection system and all other equipment, materials and incidental costs necessary to furnish, install and program a complete and functioning traffic control system as specified and as shown in the contract documents. Shop drawings of all traffic signal equipment shall be submitted by the Contractor for Town review and approval prior to ordering said equipment. The Contractor shall expedite the procurement of the traffic signal controller to ensure timely delivery and avoid delay to the project schedule.

The work includes pulling cable through existing conduit. The contractor shall verify the integrity of the existing conduit prior to work and make the necessary repairs to provide the proposed/intended connections.

All work under these items shall conform to the relevant provisions of Section 800 of the Standard Specification, the 2009 Manual on Uniform Traffic Control Devices (MUTCD), and the following technical provisions:

SERVICE CONNECTIONS

The Contractor shall utilize the existing service connection at the Washington Street (Route 9) at Brookline Avenue intersection.

FLASHING OPERATION

Changes from automatic flashing to stop-and-go operation and from stop-and-go to automatic flashing operation shall occur as set forth in Section 4D.28 – 4D.31 of the 2009 MUTCD.

TRAFFIC SIGNAL EQUIPMENT

The traffic signal controller unit (CU), malfunction management unit (MMU) and all other ancillary traffic signal control components included in the traffic control cabinet shall comply with the National Electrical Manufacturers Association (NEMA) Standard No. TS 2-1998, Traffic Controller Assemblies with National Transportation Communications for ITS Protocol (NTCIP) Requirements.

TRAFFIC SIGNAL CONTROLLER

The controller for this project shall comply with the specifications of the BOSTON TRANSPORTATION DEPARTMENT (BTD) for ACTUATED CONTROLLERS dated January 23, 2008.

LOAD SWITCHES

Note: The controller cabinet assembly shall be initially supplied with a full complement of load switches to accommodate each available position of the backpanel.

FLASH TRANSFER RELAYS

Note: The controller cabinet assembly shall be initially supplied with a full complement of flash transfer relays to accommodate each available position of the backpanel.

EMERGENCY VEHICLE PREEMPTION

The existing manually activated preemption system from the Brookline Fire Station shall be utilized with the new controller in accordance with the timing plans specified.

A new optical emergency vehicle preemption system shall be installed in the same cabinet as the controller. The system shall be Global Traffic Technologies, LLC (GTT) OPTICOM Priority Control System Model 700 series.

The emergency vehicle preemption control system shall consist of a data-encoded phase selector to be installed within the traffic control cabinet. This unit will serve to validate, identify, classify and record the signal from the optical detectors located on support structures at the intersection.

Upon receiving a valid signal from the detector, the phase selector shall generate a preempt call to the controller initiating a preemption operation as shown on the plans.

The optical detectors shall be single input, single output units used to control one approach. All traffic signal installations shall be supplied with a minimum of two optical detectors unless otherwise noted in the major item list. The optical detector shall be OPTICOM model 711 series.

The phase selector shall be a rack-mounted plug-in two or four channel, dual priority device. The phase selector shall plug into a shelf-mounted single card slot chassis. Programming the phase selector shall be via a PC-based computer utilizing unit specific software. One copy of software, on compact disc shall be supplied and licensed to the Department. A hard copy of final programming data shall be left in the control cabinet. The CONTRACTOR shall supply a complete set of interface cables for phase selector to laptop connection.

The CONTRACTOR shall install a confirmation strobe at the traffic signal location as shown on the plans. The confirmation strobe shall serve to validate to the driver of the emergency vehicle that the traffic signal has recognized the preemption call and will initiate the proper preemption sequence. The confirmation strobe shall have a clear/white lens. The strobe shall be Whelen brand.

The CONTRACTOR shall be responsible for the proper programming of the phase selector, orientation of the optical detectors, and all other work necessary to provide a complete and operating emergency vehicle preemption system.

The CONTRACTOR may be required to field adjust the location of the optical detectors for optimum line of sight detection in the presence of the Engineer to properly detect preemption calls from approaching vehicles.

The strobe light for the emergency vehicle pre emption system shall not be energized by a spare traffic signal conductor. It shall be connected to the cabinet by its own #14-4 wire.

VIDEO DETECTION

The Contractor shall provide a Video Detection System to detect vehicles as shown on the plans.

The major components of the Video Detection System are further described as follows:

A. The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

B. The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware.

C. Video Detection System Cameras
   1) The system shall consist of the Iteris RZ4A-WDR Video Detection Camera.

D. Video Detection System Cable
   1) The Video Detection System Cable shall interconnect the Video Detection System Camera with the Video Detection System Hardware in the traffic signal control cabinet.
   2) The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied.
   3) The Video Detection System Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.
   4) The Video Detection System Cable shall be installed with a suitable drip loop to prevent the entrance of water into the housing.

E. Video Detection System Hardware
   1) The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.
   2) The Video Detection System Hardware shall include interface device(s) which shall be installed in the traffic control cabinet.
   3) The interface device(s) shall be used to terminate the traffic controller cabinet end of the Video Detection System Cable.
      a) The interface device(s) shall contain transient suppression devices for all signals transported on the Video Detection System Cable, including but not limited to video, data, and power.
         - The surge protector shall be electrically connected to the cabinet ground rod.
         - Surge protectors should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The protector complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.
         - Units should be pre-approved or unconditionally warranted for at least 10 years and certified to comply with the product's published specifications by an independent laboratory.

b) The interface device(s) shall contain a switch or shut-off mechanism that shall allow the user to turn off AC service to all components of the Video Detection System.
c) The interface device(s) shall contain a connector for interfacing to a configuring device and/or a Windows based computer in the field for the purpose of configuring the Video Detection System, viewing real time video, and for updating the flash memory of the Video Detection System with updated application software.

4) The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, a modem for transport of NTSC video to the traffic operations center, and a configuring device and/or a Windows based computer in the field.

Limited Warranty

The supplier shall provide a limited two-year warranty on the video detection system. See suppliers standard warranty included in the Terms and Conditions of Sale documentation.

During the warranty period, technical support shall be available from the supplier via telephone within 4 hours of the time a call is made by a user, and this support shall be available from factory-certified personnel or factory-certified installers.

During the warranty period, updates to VDP software shall be available from the supplier without charge.

Maintenance and Support

The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the video detection system. These parts shall be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale for said parts.

The supplier shall maintain an ongoing program of technical support for the video detection system. This technical support shall be available via telephone, or via personnel sent to the installation site upon placement of an acceptable order at the supplier's then current pricing and terms of sale for onsite technical support services.

Installation or training support shall be provided by a factory authorized representative.

All product documentation shall be written in the English language.

VEHICLE DETECTOR AMPLIFIERS

The loop detector amplifiers shall be supplied as two-channel rack mounted units with programmable delay and extension timing, however, all delay and extension programming shall be completed internally in the controller unit.

A chart shall be permanently affixed to the controller cabinet door, which labels each amplifier channel. The chart shall indicate the detector number, street name, approach direction, lane assignment, corresponding phase and terminal number for each amplifier channel.

The detector lead-in cables shall also be similarly labeled, both in the controller cabinet and in the pull box containing the detector lead-in splice. This labeling and attachment shall be of

durable materials such as brass or plastic, attached by wire or plastic ties. Adhesive attachment of the label shall not be acceptable.

Note: The control cabinet shall be supplied with one (1) spare, two-channel rack mounted loop amplifier, as indicated in the major items list on the plan sheets.

VEHICLE LOOP DETECTORS

Wire loop detectors shall be installed in the roadway for system loops (vehicle detection). In advance of the loop detector installation, the Contractor shall mark, on site, the loop detectors with any changes required by field conditions such as manholes. The loop detector layout shall be inspected and approved by the Engineer before the loop detectors are installed.

Loop wire shall be encased in a protected plastic tubing of PVC or polyethylene plastic, IMSA 51-5,0.25 inch outside diameter, and the wire may have cross-linked polyethylene insulation or it may have THHN/THWN insulation.

Splicing insulator shall be an approved re-enterable rigid body splices kit with a non-hardening sealing compound compatible with the wire insulation.

Splice and Connection: Splicing and connection shall be made in the pull box nearest the roadway loop sensor but not exceeding four loops per pull box. All loops included in a detector group as shown on the plans shall be spliced in a single pull box. Each lead and lead-in connector shall be stripped back and spliced using a pressure type wire connector applied with a crimping tool. Multiple loop sensors shall be identified as detailed on the plans.

Lead-in splicing shall be staggered to prevent contact with each other. Each crimped splice shall be soldered and insulated. The insulation material shall be heat-shrinked polyolefin. The shielded lead-in cable outer jacket and shield shall be stripped back sufficiently to ensure that the shield cannot come into contact with the spliced conductors. Follow the instructions of the kit manufacturer for this procedure when installing the re-enterable splice kit.

***NOTE WELL:* The above splice shall be done on the day of the loop wire installation to prevent the entrance of any moisture into the plastic tubing.**

The lead-in conductors shall be connected to the appropriate terminals in the controller cabinet, by using crimped or soldered terminal ends. The heat source for soldering shall be electrical not exceeding 30W capacity.

Testing of Loops: The following test procedure shall be performed in the presence of the Engineer before and after the loop sensor is sealed in the pavement as detailed below. The cost of equipment, labor, and materials to perform such testing and similar re-testing following repairs, replacement, or adjustment of any detector within the project area shall be included in the contract unit price for this Item.

After installation of wire loop sensors in the roadway and installation of shielded lead-in connecting the loop sensors to the controller cabinet, each loop sensor and lead-in combination shall be tested (at the controller cabinet) for proper installation. The resistance from lead to lead

of the same loop shall not exceed three (3) ohms per one thousand (1000) feet as measured by a high quality meter suitable for measurements of low resistance in the range of 1 to 6 ohms.

A megohm meter test at 500 volts DC shall be made between the two leads of a loop/lead-in combination temporarily spliced together, but otherwise disconnected from all terminals, and the shield drain wire and the earth ground connection. These resistances shall be at least one hundred (100) megohms.

A megohm meter test at 500 volts DC shall be made between lead-in shield and the earth ground rod. This resistance shall be at least one hundred (100) megohms.

The meter used for these tests shall be checked for calibration each day of use by using a resistor block of 5% resistors simulating loads of 1 megohm, 20 megohm and 100 megohms. The observed meter reading shall be 10% of the nominal resistor load.

If any loop sensor and lead-in combination fails to pass any one of the four (4) tests, it shall be repaired and then re-tested on two occasions at least two (2) weeks apart and then shall pass on each re-test occasion. If the loop sensor lead-in combination does not pass all these re-tests, a new loop sensor and/or lead-in shall be installed, and shall pass these tests, at no additional cost.

After the above tests have been satisfactorily completed, all loop sensor/shielded lead-in inductance shall be measured and a written report of the results shall be filed with the Engineer and a copy stored with the "box prints" at the intersection.

TRAFFIC CONTROLLER CABINET

The controller cabinets shall conform to the specifications of the BOSTON TRANSPORTATION DEPARTMENT (BTD) for ACTUATED CONTROLLERS dated January 23, 2008. The Cabinet shall be a ground-mounted type and installed on concrete foundation as shown on the plan.

The existing controller cabinet with internal components shall be removed and stacked at the Municipal Service Center located at 870 Hammond Street, Brookline, MA 02467. The contractor shall contact the Municipal Service Center at (617) 879-4900 between the hours of 7am and 3pm Monday through Friday to schedule delivery of the cabinet. If the existing controller cabinet with internal components is determined not to be acceptable by the Town, it shall become the property of the Contractor to dispose of offsite at no additional cost.

The existing controller cabinet foundation shall be utilized and modified as necessary by the Contractor. Controller cabinet foundations shall not obstruct a sidewalk or crosswalk so that passage by physically challenged persons is impaired.

TESTING OF GROUNDING SYSTEM

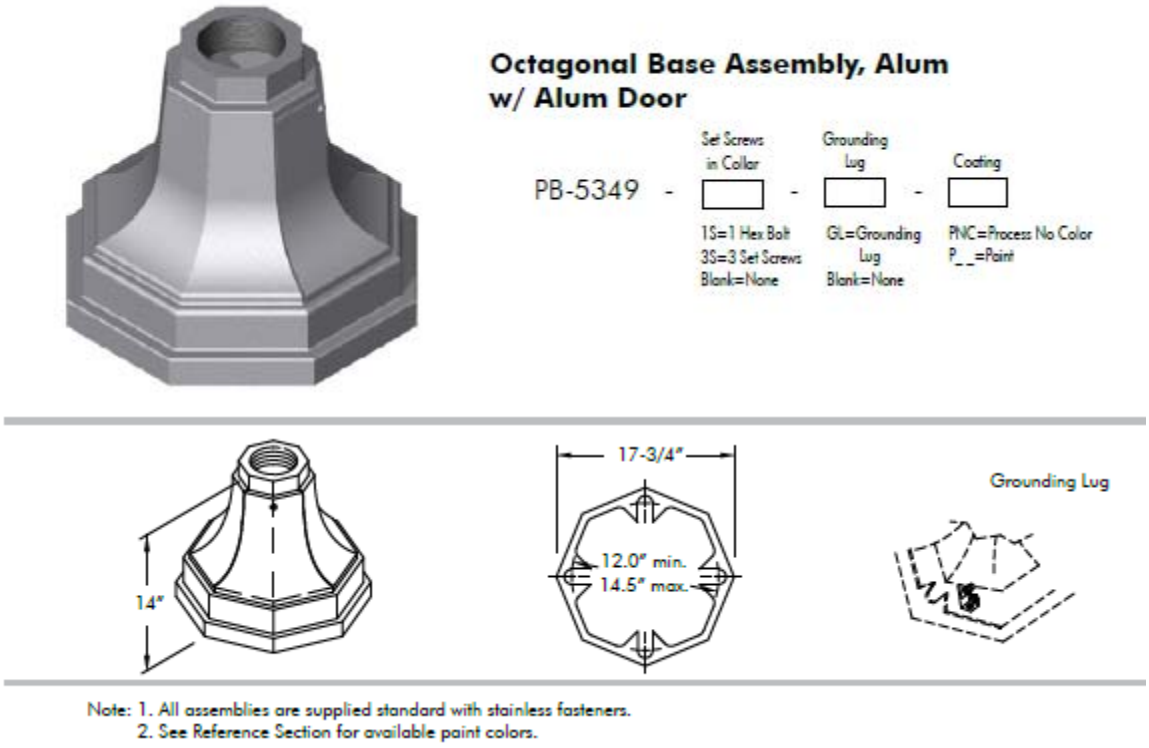
The Contractor shall perform testing of the equipment grounding system in the presence of the Engineer in accordance with the Standard Specifications.

POSTS AND BASES

Signal posts and bases shall be steel shafts with octagonal bases. The PELCO® PB-5349 Octagonal Base Assembly made from Cast Aluminum should be used. An Aluminum door with

set screws and grounding lug should also be utilized. The post and base should be powder coated gloss black in color.

Signal base foundations located within a sidewalk shall not violate ADA minimum passage requirements.



MAST ARM POLES AND FOUNDATIONS

Mast arm foundations located within a sidewalk shall not violate ADA minimum passage requirements. Mast arm, poles and foundations shall be fabricated and constructed in conformance with MassDOT's Mast Arm & Foundation Details Standard Drawings included in the plans.

All mast arm poles shall be galvanized steel monolevers with shoe bases, unless otherwise directed. Acceptance of Type II mast arm poles shall be contingent upon review and approval of the shop drawings submitted by the Contractor. Longhand design calculations shall be submitted for all Type II Mast Arms.

The pole and arm shaft shall be fabricated from commercial quality hot rolled steel. The shaft shall have only one (1) longitudinal, automatically, electrically welded joint, and shall have no intermediate horizontal joints or welds. Only one (1) length of steel sheet shall be used, which shall be formed into a continuously tapered shaft, having a taper length of 0.14" per foot.

In addition, the mast arm connection to the mast arm post shall be of the Flange Connection type and the mast arm post base shall include simple Cast Aluminum Nut Cover.

Based on the soil boring logs and the blow counts (included as part of these special provisions), the foundations shall be to the depths noted below.

Location	Mast Arm Length	Foundation Depth	Foundation Diameter
Sta. 116+70, 37' LT	40’ (medium loads)	16’-0”	4’-0” (18-#9 vert. bars)
Sta. 16+80, 38' RT	45’ (medium loads)	16’-0”	4’-6” (18-#10 vert. bars)

Foundations for Signal Posts, Mast Arm Poles, Strain Poles and Controller Cabinets foundations shall be constructed using 4000 psi, 1½ inch, 565 Cement Concrete Masonry conforming to the relevant provisions of Section M4 of the Standard Specifications and the following:

1. Reinforcing steel shall be ASTM A-615, Grade 60.

2. The top forming of cast-in-place units shall extend downward for a minimum of 24” on the side of any foundation. The lower portions of all foundations shall be placed directly against undisturbed earth. No forms or reinforcing for foundations for mast arm poles, span wire poles and control cabinets shall be set nor shall concrete be placed until the excavation has been inspected by the Engineer and his approval to proceed has been given.

SIGNAL HEADS

Signal heads shall be rigid mounted on mast arms, with the bottom of all signals at the same height. All traffic signal lenses shall be 12” in diameter unless otherwise noted on the plans. Signal heads shall be equipped with 5” solid backplates. Backplates shall have a 3-inch yellow micro-prismatic retroreflective sheeting along the outer edge. All signal heads shall be equipped with light emitting diode (L.E.D.) 12” modules as noted on the plans.

Signal heads shall be made of aluminum. Signal heads shall be installed with cut tunnel visors unless otherwise noted on the major items list on the plans.

TRAFFIC SIGNAL LED MODULES

The LED module shall be an approved item from MassDOT’s Traffic Control Devices Approved Equipment List. See “Traffic Controls” under “Qualified Construction Materials” on the Department website:

http://www.mhd.state.ma.us/downloads/trafficMaterials/TrafficSignalControls_012313.pdf

To prevent the LED module warranty from being voided, the connecting leads on the module shall not be cut. The original LED module leads shall be connected to the signal head terminal block as continuous wire without splices.

The LED signal module will be replaced or repaired by the manufacturer if it exhibits one of the following:

1. A failure due to workmanship or material defects within the first 60 months of field operation

2. A greater than 40 percent light output degradation or a fall below minimum intensity levels (as defined by the latest ITE performance specifications) within the first 36 months of field operation.

PEDESTRIAN HEADS

Pedestrian head indications shall be illuminated L.E.D. type displaying the graphical symbols of a walking person and/or upraised hand. All LED indications on the pedestrian signal shall have an automatic dimming circuit for night illumination to reduce long-term degradation to the LEDs. Pedestrian heads shall be made of aluminum.

Each visual pedestrian indication shall be complemented by a time display indication. Each time display indication shall be self-programming and microprocessor based, with red LEDs used in the display. The time display will countdown the amount of time remaining in each flashing don't walk time interval for viewing by the ambulatory public. The model provided shall be consistent with most recent Town installations.

SIGNAL INTERCONNECTION SYSTEM

The work to be performed under this item shall consist of furnishing all labor, cable, materials, equipment, appurtenances and making electrical connections for the interconnection system proposed between the intersections of Route 9 at Brookline Avenue and Route 9 at South Huntington Avenue.

The interconnect cable shall have 12 pairs #22AWG IMSA 19-2 in one 3" conduit and existing conduit already installed as noted on the plans.

The signal interconnection system for this project shall comply with the specifications of the BOSTON TRANSPORTATION DEPARTMENT (BTD) for SIGNAL INTERCONNECTION SYSTEM dated May 12, 2005.

PEDESTRIAN PUSH BUTTONS

Pedestrian push buttons shall be Polara EX Communicator Navigator Push Button Station with R10-3e Option C 9"x12" Countdown sign.

Pedestrian push button controls shall be raised from or flush with their housings and shall be a minimum of 2" in the smallest dimension. The force required to activate the controls shall be no greater than 5lbs.

Each push button shall be complemented with an audible and vibro-tactile indication with LED confirmation light. Each separately phased pedestrian movement shall have its own distinctive audible emanation in order for visually impaired pedestrians to discriminate which phase is appropriate given his or her destination and/or direction of travel.

The audible emanation shall be a percussion type sound. No buzzer or ringing type sounds will be acceptable. The output level of the audible pedestrian signal shall vary in intensity with significant fluctuations in ambient noise conditions. At a minimum, the output level shall vary in intensity from daytime to nighttime operations.

Pedestrian push buttons shall be located as close as practicable to the sidewalk curb ramp serving

the controlled crossing and shall permit operation from a clear ground space. If two crosswalks, oriented in different directions, end at or near the same location, the positioning of pedestrian push buttons and/or legends on the pedestrian push button signs should clearly indicate which crosswalk signal is actuated by each pedestrian push button.

Note: The contractor is responsible for determining the correct arrow orientation of the R10-3e sign and or pedestrian push button.

A maximum mounting height of 42 inches above the finish sidewalk grade shall be used for pedestrian push buttons.

PAINTING

All new traffic signal equipment shall be painted in accordance to the relevant provision of Section 815 of the Standard Specifications and the following:

Controller cabinet	(Exterior)	-	Black
	(Interior)	-	Aluminum
Posts and Bases		-	Black
Mast arms & mast arm poles		-	Black
Signal housings	(Back)	-	Black
	(Front)	-	Flat Black
Signal housing supports		-	Black
Visors of signal housing	(Outside)	-	Black
	(Inside)	-	Flat Black
Louvers		-	Flat Black
Meter socket		-	Black

SOFTWARE

All local controller, malfunction management unit, loop detector amplifier and emergency vehicle preemption software shall be supplied with the latest available revision. Any software upgrades released by the manufacturer shall be supplied at no additional cost to MassDOT District 5 Office and the Town for a period of five years after acceptance of the traffic signal installation.

DOCUMENTATION

Each programmable local hardware component (i.e. controller, malfunction management unit) shall be initially programmed by the Contractor based on information contained on the plans.

Note: Three bound sets of hard copy programming per device shall be supplied to MassDOT District 6 Office and the Town by the CONTRACTOR.

Upon final acceptance of the signal by Brookline, the CONTRACTOR shall supply 8½"x11" or 11"x17" laminated copy of the traffic signal design plan and sequence and timing chart to be left in the cabinet documentation envelope mounted on the inside of the cabinet door.

COMPENSATION

Work under Items 816.01 will be paid for at the respective Contract unit prices per Lump Sum, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for the maintenance of existing signal installation during construction, but all costs in connection therewith shall be included in the Contract unit price bid.

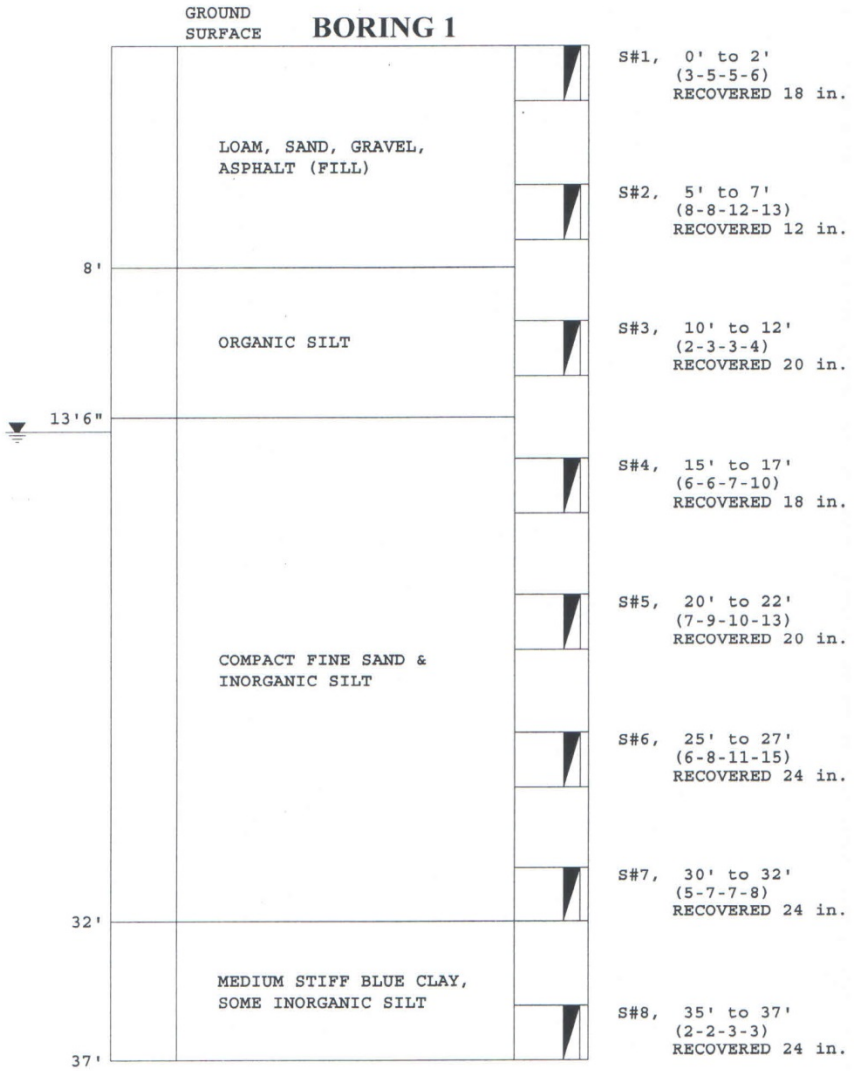
Conduit will be paid for separately under 3 Inch Electrical Conduit, Item 804.3. Pull boxes shall be paid for separately under Handhole 12 X 24 Inches – BTD Standard, Item 811.32.

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: BROOKLINE DPW-ENGINEERING, BROOKLINE, MA Date: 5-22-2015 Job No.: 2015-76

Location: ROUTE 9 @ POND AVE. & RIVER RD., BROOKLINE, MA Scale: 1 in.= 6 ft.



WATER LEVEL 14'
SIZE OF CASING: NW, LENGTH: 30'0"
DRILLER: J. DESIMONE
DATE STARTED & COMPLETED: 5-21-2015

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

Sheet 1 of 1

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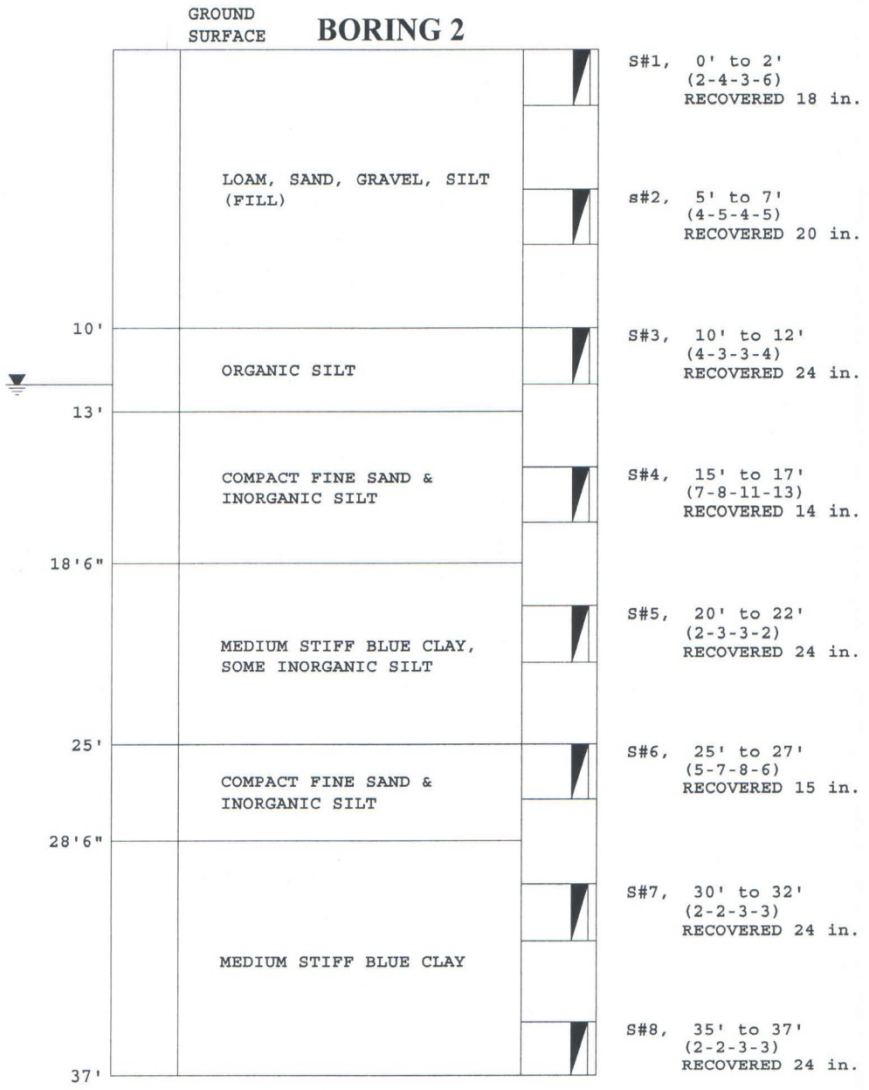
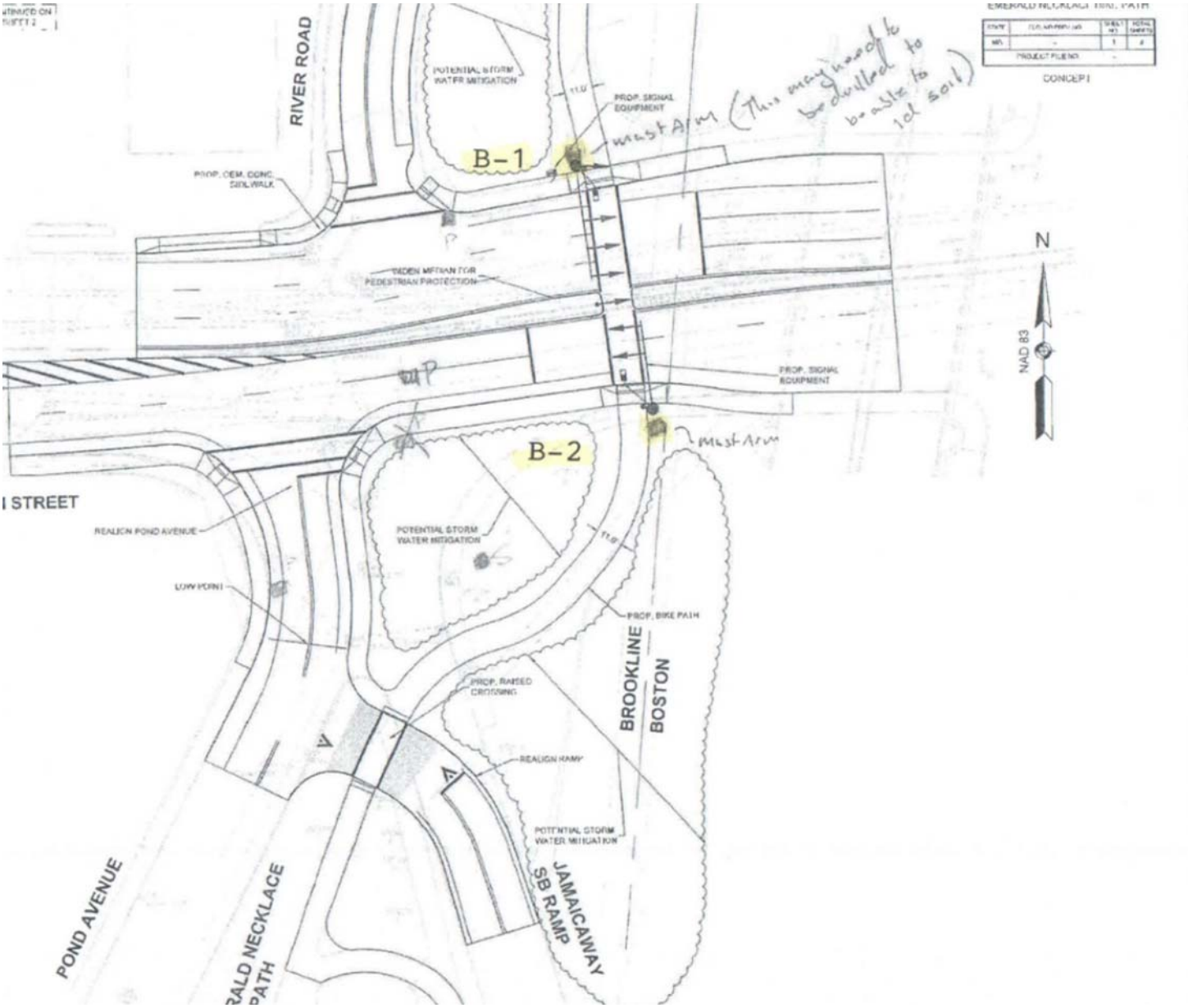


WATER LEVEL 12'
SIZE OF CASING: NW, LENGTH: 20'0"
DRILLER: J. DESIMONE
DATE STARTED & COMPLETED: 5-21-2015

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

Sheet 1 of 1


RIVER ROAD
POTENTIAL STORM WATER MITIGATION
PROP. SIGNAL EQUIPMENT
mast Arm (This may need to be drilled to be able to id soil)
B-1
PROP. CEM. CONC. SIDEWALK
GREEN MEDIAN FOR PEDESTRIAN PROTECTION
CIP
PROP. SIGNAL EQUIPMENT
N
NAD 83
B-2
mast Arm
I STREET
REALIGN POND AVENUE
POTENTIAL STORM WATER MITIGATION
LOW POINT
PROP. BIKE PATH
BROOKLINE
BOSTON
PROP. RAISED CROSSING
REALIGN RAMP
POTENTIAL STORM WATER MITIGATION
JAMAICAWAY
SB RAMP
POND AVENUE
RALD NECKLACE
PATH
CONCEPT

ITEM 847. TRAFFIC SIGN FOUNDATION EACH

Work under this Section shall conform to the applicable provisions of Section 840 of the Standard Specifications and the following:

GENERAL

Work under this item includes the installation of the concrete foundation and breakaway P5 post anchor for all traffic sign installations. The P5 anchor will be provided by the Town for the Contractor to install in the foundation. The P5 post, sign and mounting hardware will be provided and installed by Town forces. Sign locations will be coordianted with the Town prior to foundation installation.

Work under this item also includes the installation of the concrete foundation for D6/D8 signs. The posts will be provided by the Town for the contractor to install in the foundations. The signs will be installed by Town forces.

METHOD OF MEASURMENT AND BASIS OF PAYMENT

Traffic sign foundation will be measured for payment by the each.

Traffic sign foundation will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for the excavation, concrete or installation of the P5 anchor, installation of D6/D8 posts, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 864.06 IMPRINTED CROSSWALK SQUARE FOOT

TrafficPatternsXD™

Imprinted Aggregate Reinforced Preformed Thermoplastic Pavement Marking System

1. Use: TrafficPatternsXD™ is a durable imprinted aggregate reinforced preformed thermoplastic pavement marking system (herein "System") that provides a textured, highly attractive and durable topical treatment to the surface of asphalt pavement. Typically TrafficPatternsXD replicates, in relief, the grout lines common to brick or other types of unit pavers, but may also be used to create other patterns. It is intended for use on asphalt pavements to create traffic calming solutions and decorative crosswalks, medians, intersections and through areas in parking lots. It provides a seamless, aesthetic look without the trip hazards and ongoing maintenance often associated with pavers and stamped concrete.

1.1 TrafficPatternsXD is typically supplied in panels measuring 2 ft. x 2 ft. [±⅛ in.] (.61m x .61m [±3mm])

1.2 TrafficPatternsXD must be able to be applied to asphalt surfaces without preheating the application surface to a specific temperature.

1.3 TrafficPatternsXD must be able to be applied in temperatures down to 45ºF (7ºC) without any special storage, preheating or treatment of the material before application.

1.4 TrafficPatternsXD is applied to asphalt pavement using proprietary StreetPrint®/StreetHeat® reciprocating infrared heating equipment. A two-part epoxy sealer specified by the manufacturer, Ennis- Flint, must be applied to the substrate prior to preformed thermoplastic application to ensure proper adhesion, and to provide reinforcement for larger volumes of material. Immediately following sealer application, panels of TrafficPatternsXD are positioned properly on the asphalt substrate. The TrafficPatternsXD is then heated to the required melting temperature. Additional aggregate may be applied to the TrafficPatternsXD surface as needed following the melting process, to achieve added friction properties and a uniform surface appearance. As the TrafficPatternsXD is cooling, it is imprinted with a vibratory plate compactor and a template made from 3/8 in. (9.5 mm) flexible wire rope in the required design to create crisp, clean lines which define the pattern. For crosswalks, it is typically demarcated by applying white PreMark® preformed thermoplastic transverse lines made by Ennis-Flint on both sides of the installation.

1.5 TrafficPatternsXD is available in a variety of standard colors and patterns. Color can be used to create patterns within the crosswalk area to reflect the typical white “continental” crosswalk bars for additional visibility and awareness. Within certain limitations, custom patterns and colors are available upon request.

The Imprinted Crosswalk shall be an “offset brick” pattern and shall be a “brick red” color.

1.6 TrafficPatternsXD is a resilient, aggregate reinforced preformed thermoplastic product which contains a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements and where the top surface contains anti-skid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 6 (Mohs scale).

1.7 TrafficPatternsXD must be resistant to the detrimental effects of motor fuels, antifreeze, lubricants, hydraulic fluids, etc.

2. MANUFACTURING CONTROL AND ISO CERTIFICATION: Ennis-Flint is ISO 9001:2008 certified for design, development and manufacturing of preformed thermoplastic, and will provide proof of current certification.

3. TrafficPatternsXD™ PREFORMED THERMOPLASTIC MATERIAL: Must be composed of an ester modified rosin impervious to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements. Pigments and anti-skid/anti-slip elements must be uniformly distributed throughout the TrafficPatternsXD preformed thermoplastic material. TrafficPatternsXD conforms to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state, being non-reflective, and potentially being of a color different from white or yellow.

3.1 Pigments:

3.1.1 White: The TrafficPatternsXD material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.

3.1.2 Other Colors: The pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

3.2 Skid Resistance: The surface of the TrafficPatternsXD preformed thermoplastic material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303.

3.3 Slip Resistance: The surface of the TrafficPatternsXD preformed thermoplastic material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum static friction of coefficient of 0.6 when tested according to ASTM C 1028 (wet and dry), and a minimum static coefficient of friction of 0.6 when tested according to ASTM D 2047.

3.4 Thickness: The TrafficPatternsXD material must be supplied at a minimum thickness of 150 mil (3.8mm).

3.5 Environmental Resistance: The TrafficPatternsXD material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.

3.6 Storage Life: The TrafficPatternsXD material may be stored for 12 months, if stored indoors and protected from the elements.

3.7 PreMark® Transverse Lines to Supplement TrafficPatternsXD™ System Application: Supplied as white, retroreflective preformed thermoplastic line stripe material in 90 mil (2.3 mm) or 125 mil (3.2 mm) thicknesses, material is available in 6 in. (.15m), 8 in. (.20m) or 12 in. (.30m) widths. PreMark preformed thermoplastic material may be supplied and applied by the certified applicator in conjunction with the TrafficPatternsXD preformed thermoplastic System, and is available from Ennis-Flint. (Consult the PreMark published application instructions for proper application methods.)

4. SPECIALIZED APPLICATION EQUIPMENT:

4.1 Stamping Templates: A wire rope template is required in the execution of the TrafficPatternsXD System. The template is used for imprinting the defined pattern once the TrafficPatternsXD preformed thermoplastic has been applied. The wire rope diameter for the imprinting template used for the specified pattern is 3/8 in. (9.5mm). The stamping templates are produced and distributed by Ennis-Flint.

4.2 StreetPrint®/StreetHeat® Heating Equipment: Ennis-Flint manufactures and distributes StreetPrint®/StreetHeat® brand reciprocating infrared heating equipment designed specifically to elevate the temperature of the TrafficPatternsXD preformed thermoplastic material and asphalt pavement without adversely affecting it. The primary heating unit must employ a bank of propane-fired infrared heaters, mounted on a track device that allows the heater bank to reciprocate back and forth over a designated area, thereby allowing the operator to monitor the temperature of the TrafficPatternsXD preformed thermoplastic at all times during the pavement heating process.

4.2.1 A smaller, mobile StreetPrint®/StreetHeat® infrared heater manufactured and distributed by Ennis-Flint is designed specifically to heat areas such as borders and narrow areas that are inaccessible to the primary heaters. This secondary heater also allows the operator to monitor the temperature of the TrafficPatternsXD preformed thermoplastic at all times during the heating process.

4.2.2 The Magnum or Flint2000EX hand-held propane heat torch distributed by Ennis-Flint shall be used to heat isolated areas of the preformed thermoplastic.

4.3 Sealer: A two-part epoxy sealer specified and distributed by Ennis-Flint must be applied to the substrate prior to the TrafficPatternsXD material application to ensure proper adhesion, and to provide reinforcement for larger volumes of material.

4.4 Specialized Sealer Dispensing Gun: Used to dispense the required two-part epoxy sealer onto the substrate. The sealer dispensing guns are distributed by Ennis-Flint.

4.5 TrafficPatternsXD™ Hand Held Finishing Tool: Enables the applicator to complete the imprinting of the thermoplastic in areas around permanent structures, such as curbs and manholes covers, which may be inaccessible to the stamping template. The hand held finishing tools are distributed by Ennis-Flint.

4.6 Aggregate: Supplemental anti-skid/anti-slip elements to be applied to the surface of the molten TrafficPatternsXD thermoplastic as needed, if the factory applied anti-skid/anti-slip elements embed too deeply into the surface of the molten thermoplastic material during the heating process. (Embedded aggregate is exposed upon wear for extended skid resistance.) The aggregate is distributed by Ennis-Flint.

4.7 Air Powered Spray Hopper: Used to spray supplemental anti-skid/anti-slip elements (aggregate) on the surface of the molten TrafficPatternsXD preformed thermoplastic in a uniform manner. The air powered spray hoppers are distributed by Ennis-Flint.

4.8 Vibratory Plate Compactor (700-900 lb. / 318-408 kg): Shall be used for pressing the 3/8" (9.5mm) wire rope stamping templates into the TrafficPatternsXD thermoplastic to create the specified pattern in both the thermoplastic and asphalt substrate. Ennis-Flint does not supply vibratory plate compactors.

5. APPLICATION (Asphalt Substrate Only):

5.1 Manufacturer Certified Applicator Requirement: TrafficPatternsXD material shall be supplied and applied only by an Ennis-Flint TrafficScapes™ Certified Applicator. The applicator shall provide proof of current certification before commencing work. The TrafficScapes Certified Applicator shall follow the current published TrafficPatternsXD application procedures.

5.2 Substrate Condition: The TrafficPatternsXD material must only be applied to a stable, high quality asphalt pavement substrate over a stable base that is free of defects, as per the Ennis-Flint published TrafficPatternsXD Substrate Guide. The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

5.3 Procedure: TrafficPatternsXD is applied to asphalt pavement using StreetPrint®/StreetHeat® reciprocating infrared heating equipment. The material must be able to be applied at ambient and road temperatures down to 45ºF (7ºC) without any preheating of the pavement to a specific temperature. A two-part epoxy sealer specified by Ennis-Flint must be applied to the substrate prior to the TrafficPatternsXD preformed thermoplastic application. Immediately following sealer application, the panels of aggregate reinforced TrafficPatternsXD preformed thermoplastic are positioned properly on the asphalt substrate with the aggregate side facing up. The TrafficPatternsXD preformed thermoplastic is then heated to the required melting temperature. Additional aggregate may be applied to the TrafficPatternsXD preformed thermoplastic surface as needed following the melting process. As the TrafficPatternsXD material is cooling, it is imprinted with a stamping template made from 3/8 in. (9.5 mm) flexible wire rope in the required design using a vibratory plate compactor. The TrafficPatternsXD preformed thermoplastic material is then allowed to cool thoroughly before being opened to vehicle or pedestrian traffic. (Consult the published TrafficPatternsXD application procedures for complete information.)

5.4 TrafficPatternsXD shall not be applied to Portland Cement Concrete.

6. PACKAGING: The TrafficPatternsXD preformed thermoplastic material shall be packaged in cardboard cartons with a plastic sheet between each layer of preformed thermoplastic. The cartons in which TrafficPatternsXD is packed shall be non-returnable and shall not exceed 25 in. (.64m) in length and 25 in. (.64m) in width. The cartons shall be labeled for ease of identification. The weight of the individual carton must not exceed seventy (70) pounds (32 kg). A protective film around the carton must be applied in order to protect the TrafficPatternsXD material from rain or premature aging.

7. TECHNICAL SERVICES: The successful bidder shall provide technical services as required.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Imprinted Crosswalk will be measured for payment by the square foot.

Imprinted Crosswalk will be paid for at the Contract unit price per square foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work. All costs in connection therewith shall be included in the Contract unit price bid.

ITEM 864.025	**PREFORMED REFLECTORIZED BICYCLE LANE SYMBOL**	**EACH**
ITEM 866.04	**4 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)**	**FOOT**
ITEM 866.08	**8 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)**	**FOOT**
ITEM 867.04	**4 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)**	**FOOT**
ITEM 867.12	**12 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)**	**FOOT**
ITEM 870.12	**12 INCH WHITE REFLECTIVE TAPE (INLAY)**	**FOOT**

DESCRIPTION

Work under this Section includes applying reflectorized markings to hot mix asphalt and cement concrete pavement in accordance with the Standard Specifications and as specified herein. All pavement markings shall be in accordance with the latest Manual on Uniform Traffic Control Devices standards unless otherwise specified.

MATERIALS

A. **Thermoplastic Reflectorized Pavement Markings** shall be of 100% solids. The binder shall consist of synthetic alkyd resins, and be homogeneously incorporated with all the necessary prime pigments, fillers and glass beads. Meet ASTM (E1710, E2177 and E2832) retroreflectivity requirements. Markings will have a minimum thickness of 90 mils drop-on beads must be applied evenly and adhered to a depth of 60%.

B. **Pre-formed Reflectorized Thermo Plastic Traffic Markings** shall be PreMark with ViziGrip by Ennis-Flint or Town approved equal.

C. **Stamped Colorized Brick Pattern** shall be TrafficPatternsXD, offset brick pattern, brick red color by Ennis Flint.

D. **Tape Inlay** shall be 3M “Stamark” 380I ES (Inlay) by 3M or “Deltaline XRP” by Brite-Line or Town approved equal.

CONSTRUCTION METHODS

Construction Methods shall be as per manufactures specifications.

Work shall be done only in seasonable weather and in accordance with good painting practices. Air and surface temperatures is to be a minimum of 50F and rising at the time of marking operations. Surfaces should be clean and dry The Engineer shall make the final determination as to suitability of weather or other related conditions.

Chalk lines or a method of spotting that is acceptable to the Engineer shall be used as a guide on new work or where previous lines are not sufficiently legible in the opinion of the Engineer to provide a satisfactory guide.

All Pavement Markings shall be installed in strict accordance with the manufacturer's specifications. **NEVER MIX ALKYD AND WATERBORNE TRAFFIC PAINTS.** They are incompatible and mixing will result in a congealed mess.

The painted lines shall remain protected until sufficiently dry to bear traffic. Wet line paint guards shall not extend for a distance greater than necessary without leaving a gap to facilitate the movement of cross traffic. Cones shall be kept on the line throughout the drying period. The Contractor shall assign personnel to properly control the position of the guards during the entire drying period. Such control is dependent on traffic density, lane widths etc., and shall be as deemed necessary by the Commissioner.

If, for any reason, paint is spilled or tracked on the highways or any markings applied by the Contractor that deviate from the desired pattern, the Contractor shall remove such paint by a method that is not injurious to the roadway surface and is acceptable to the Engineer; clean the roadway surface and prepare the surface for a re-application and re-apply the line as directed, without additional compensation for any of the foregoing including the re-application of the painted lines.

All personnel working under this contract shall abide by the motor vehicle laws of the Commonwealth insofar as they are applicable thereto.

COMPENSATION

Pavement markings shall be applied properly and shall be acceptable to the Engineer before approval for payment based on the Department's final measurements.

The length of lines to be paid shall be the actual length of lines installed under the various item of the contract. The lengths will be determined by:

1. Calculations from established base line station or
2. Calibrated measuring wheel or
3. Vehicle odometer

Broken lines shall be measured by the actual length of line installed (i.e. 15 feet of line, 25 feet of space, 15 feet of line = 30 feet of line to be paid for.)

Arrows, Symbols and Legends will be paid for at the contract unit price per each.

BICYCLE PAVEMENT MARKING SPECIFICATION

1. Bicycle Pavement Markings shall be Pre-formed Reflectorized Thermo Plastic as outlined in section 860 unless noted otherwise.

2. A bicycle rider symbol of 72” x 39” and a directional arrow of 72” x 24” spaced 72” apart shall be used as bike lane markings (Figure 1).

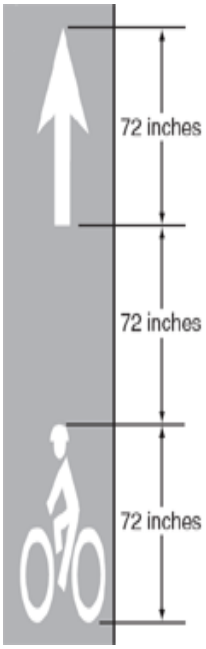


Figure 1

3. A Bicycle shared lane symbol of 111” x 39” shall be used for shared lane pavement markings (Figure 2).

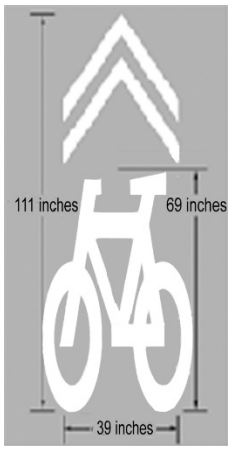
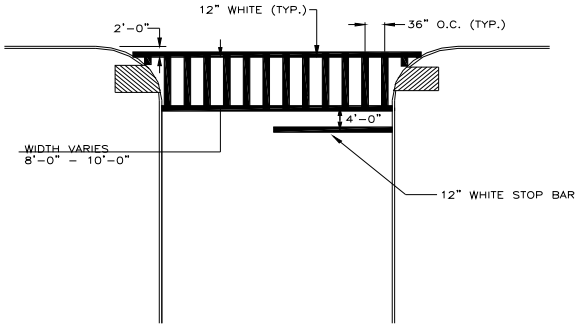


Figure 2

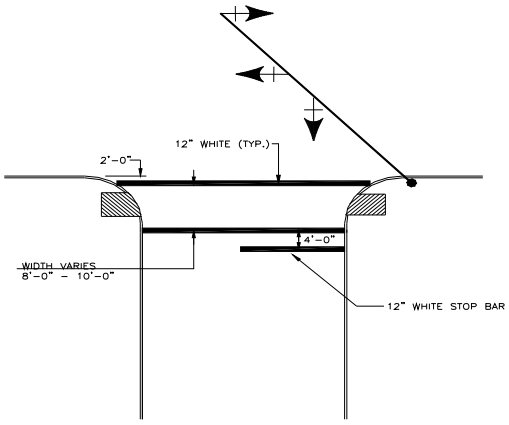
CROSSWALK LAYOUT SPECIFICATION

4. Pavement Markings for crosswalks and stop bars shall be Tape Inlay as outlined in section 860 unless noted otherwise.
5. Crosswalks shall consist of 12” wide solid white longitudinal lines. At non-signalized intersections the crosswalks shall have crossbars located 3’-0” O.C. within the longitudinal lines. (See Figure 1)



(Figure 1) NON SIGNALIZED INTERSECTION STRIPING DETAIL
NOT TO SCALE

6. Crosswalks at signalized intersections shall consist of 12” wide solid white longitudinal lines. (See Figure 2)



(Figure 2) SIGNALIZED INTERSECTION STRIPING DETAIL
NOT TO SCALE

7. The width of Crosswalks shall be 8'-0" on residential/local roadways, and 10'-0" on arterial/collector roadways. Crossbars shall be spaced 3'-0" O.C. There shall be a minimum of 4'-0" between crosswalk and Stop-Bar.

ITEM 874.2 TRAFFIC SIGN REMOVED AND RESET EACH

The work under this Item shall conform to the relevant provisions of Section 828 of the Standard Specifications and the following:

CONSTRUCTION

The Contractor shall carefully remove existing signs, attachment hardware and sign support posts as shown on the drawings and as directed by the Engineer. Existing foundations shall be removed to a depth of at least 6 inches below the existing ground and the holes backfilled with gravel. The surface shall be patched with a material to match the existing ground or as directed by the Engineer.

Signs and attachment hardware shall be satisfactorily stored and protected until reset in the proposed work. Sign support posts shall be disposed of in a satisfactory manner. New sign support posts shall be provided by the Town.

Signs and attachment hardware lost, damaged or otherwise made unsuitable for reuse while being removed, transported, stored or reset shall be replaced with new material at no additional cost. New attachment hardware shall be furnished and installed as necessary to replace any missing or unusable existing hardware.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Traffic sign removed and reset will be measured for payment by the each, complete in place.

Traffic sign removed and reset will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for dismantling, storing and resetting of the signs as designated above, installation of the new posts (supplied by Town), the excavation and disposal of the existing foundation, the supplying and placing of compacted gravel backfill where foundations and posts are removed and the patching of the existing surface, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 874.4 TRAFFIC SIGN REMOVED AND STACKED EACH

Work under this Section shall conform to the applicable provisions of Section 828 of the Standard Specifications and the following:

GENERAL

Work under this item includes the dismantling, removal, transporting and stacking all existing traffic signs designated for stacking within the limits of the project or as directed by the Engineer. The Contractor shall stack all signs on the Municipal Service Center located at 870 Hammond Street, Brookline, MA 02467. The contractor shall contact the Municipal Service Center at (617) 879-4900 between the hours of 7am and 3pm Monday through Friday to schedule delivery of the signs.

CONSTRUCTION

The supports and existing foundations shall be removed to a depth of at least 6" below the existing ground and the holes backfilled with gravel. The surface shall be patched with a material to match the existing ground or as directed by the Engineer. The supports and foundations shall become the property of the Contractor and the Contractor shall legally dispose of the items at a location not on Town of Brookline property.

If signs are attached to existing light poles, utility poles or traffic poles, only the sign and attached hardware shall be removed and stacked.

The Contractor shall be responsible for the protection of the sign until accepted by the Town of Brookline. Any signs damaged through a lack of protection or carelessness on the part of the Contractor shall be replaced by the Contractor at his own expense.

METHOD OF MEASURMENT AND BASIS OF PAYMENT

Traffic sign removed and stacked will be measured for payment by the each.

Traffic sign removed and stacked will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for dismantling, loading, transporting and stacking of the signs and supports as designated above, the excavation and disposal of the existing foundation and the supplying and placing of compacted gravel backfill where foundations and posts are removed, and the patching of the existing surface, but all costs in connection therewith shall be included in the Contract unit price bid.

Signs determined not to be acceptable by the Town shall become the property of the Contractor to dispose of offsite at no additional cost.

Alternate 1
The Brookline Public Works Department shall supply the luminaires, posts, arm assembies and Highway Lighting Load Center for contractor installation.

ITEM 813.42	**WIRE TYPE 8 NO. 6 DIRECT BURIAL**	**FOOT**
ITEM 813.521	**WIRE TYPE 10 NO. 10 GROUNDING AND BONDING**	**FOOT**
ITEM 813.522	**WIRE TYPE 10 NO. 6 GROUNDING AND BONDING**	**FOOT**

GENERAL

All work performed under this Item shall be in accordance with the relevant provisions of Section 813 of the Massachusetts Highway Department Standard Specifications for Highways and Bridges and the following:

The Contractor shall be required to furnish and install all materials, equipment and labor necessary to completely wire and operate the street lighting system. All materials and wiring procedures shall conform to the specifications contained herein and to the requirements and standard practices of the Section 800 and the following:

All wire and connectors shall conform to the standards of the National Electrical Manufacturers Association or the Underwriters' Laboratories, Inc., whichever is applicable. All materials and workmanship shall conform to the requirements of the National Electrical Code, Standards of the American Society for Testing and Materials, and any local ordinances that may apply.

Wherever any reference is made to the standards mentioned above, the reference should be construed to mean the standard that is in effect on the day the Notice to Proceed to the Contractor for the work is dated.

Wire sizes shall be based on American Wire Gage (AWG), as applied to copper conductors.

Submittals

Submittals for wire and splice materials shall be made in a timely fashion including all manufactures data sheets, and shop drawings, as applicable, and specified herein.

MATERIALS

The conductor shall be composed of soft drawn 7-strand copper of the gauge shown on the drawings. The insulation shall be installed as a single jacket of cross-linked polyethylene of Underwriter's Laboratories Type USE-2 or RHH-2-RHW-2 rated at 90 degrees C continuous in wet and dry locations, 600 volt as per the National Electrical Code.

#6 AWG ground conductor shall be bare copper as specified in M8.16.10 of the MassDOT standard specifications.
Wire and cable furnished and used shall be new and shall have the size, grade of insulation, voltage and manufacturer's name permanently marked on the outer covering at regular intervals. Wire and cable shall be delivered to the site in complete coils or reels with identifying size, type

and insulation tags. Wire and cable shall be protected from weather and damage during storage and handling.

Splicing Materials and Methods

Splicing shall be in accordance with the contract drawings and the MassDOT standard specifications. All splices shall be suitable for wet locations, including splices in pole bases and load centers. Use of wire nuts is prohibited. Connections in the pole top shall be with insulated pressure connectors.

CONSTRUCTION

No wire shall be drawn in to any conduit until all work that may cause damage to the wire is complete.

All wire shall be continuous from light pole to light pole without running splices in conduits or handholes. Splices are prohibited in handholes except ground conductor.

All wire terminals, taps and splices shall be made secure with connectors, splicing materials and methods as hereinafter specified.

All incoming wires and outgoing wires in highway lighting load centers, handholes and poles shall be banded as indicated on the contract drawings.

Grounding

Coatings and rust on conduits and grounding rods shall be removed at the location where the ground fittings are to be installed.

The bare copper conductor shall be connected to the continuous insulated bonding lead, which shall be identified with green plastic marking tape as noted in the specifications. Bonding leads for lighting fixtures on poles shall be an insulated #10 AWG, marked green, which shall be extended to the nearest handhole and interconnected to the bare copper ground wire in the handhole of gauge shown on the contract drawings and the pig tail conductor shall be connected to the ground rod. The ground wire shall also connect to the ground lug on the handhole frame and be bonded to the handhole cover.

A conductor with the same insulation of the power leads shall be installed in all conduits as a continuous bond wire. All bonding leads from fixtures, pole, control boxes, fittings and ground rods shall be connected to the continuous insulated bonding lead which shall be identified with green plastic marking tape as noted in the specifications.

All grounding shall conform to the applicable provisions of the National Electrical Code.

Field Tests

Upon the completion of each wiring system, and before any connection is made to operating equipment, the Contractor shall perform, in the presence of the Engineer, the following tests of each circuit to determine whether the installations are in acceptable working order.

a. Tests for continuity
b. Tests for ground
c. Tests for insulation resistance (Megger Test) from circuit wires to ground, and between circuit wires.

Tests for ground shall be performed in accordance with the relevant provisions of Section 813 of the Massachusetts Highway Department Standard Specifications for Highways and Bridges
The entire electrical wiring system shall be tested for continuity, grounds, resistance to ground, insulation, shorts and opens. This shall be done by means of a megohm meter test.

After installation of the wiring system is complete with the required splices, the lamp ballast primary shall be disconnected and each circuit shall be tested with a 1000 volt megger. Tests on each circuit shall be between each conductor. When the measured value is less than 200 megohms between two conductors, the Contractor shall locate the point or points at fault, make proper corrections, and then demonstrate by further test the elimination of such faults.

These tests shall be performed in the presence of the Engineer.

The test results shall be submitted to the Engineer for review and approval. If any results are questionable or inconsistent, the Contractor shall repeat the tests and make any necessary corrections at the request of the Engineer. No wiring system will be accepted until these are satisfactorily performed and approved.

The Contractor shall furnish the Engineer with a report of the megohm-meter readings for a permanent project record.

All tests and any necessary repairs or replacements that are indicated by the Engineer to produce a fault-free system will be performed at the Contractor's expense.

Warranties

The Contractor shall provide a performance warranty for six months on the entire work performed under this contract including the performance of all equipment and components of the highway lighting system specified. The performance warranty responsibility of the contractor shall commence after official acceptance by the Town of Brookline or the Engineer.

NOTE: The Contractor shall be completely responsible for all maintenance, repairs and replacement of damaged equipment during the functional test and throughout the performance warranty period.

If within 48 hours after notification by the Engineer of a malfunction, and the Contractor fails to make such repairs as necessary, the Engineer will undertake repairs of which all costs are to be

borne by the Contractor. The cost of any maintenance necessary, except electrical energy, shall be at the Contractor's expense and will be considered as included in the price paid for the Contract item involved and no additional compensation will be allowed therefore.

METHOD OF MEASUREMENT

The work of this section shall be measured by the linear foot along the center line of the conduit in which the conductor is placed. No allowance will be made for the necessary lengths of slacked cable laid around the sides of manholes, handholes, junction boxes, pull boxes, or extending from foundations for making splices, taps in cable, and connecting the internal components of control cabinets. No allowance will be made for cable in controllers, light poles or other items other than conduit.

BASIS OF PAYMENT

Payment will be made unit price by the linear foot which price shall constitute full compensation for furnishing, installing and connecting the street lighting cables, the grounding of the system, testing the lighting circuit wiring, grounding wire testing, and for furnishing any equipment and/or materials required.

The cost of any maintenance necessary to include testing, replacement of lamps, luminaires, wiring splices, grounding, and all appurtenances, except electrical energy, shall be at the Contractor's expense and will be considered as included in the price paid for the contract item.

ITEM 813.71 GROUND ROD 8 FEET LONG EACH

GENERAL

The work under this item shall conform to the relevant provisions of Section 813 of the Standard Specifications.

ITEM 821.101A ORNAMENTAL CAST ALUMINUM LAMP POST – 16 FT WITH 4 FT ORNAMENTAL ARM INSTALLATION **EACH**

GENERAL

All work performed under this Item shall be in accordance with the relevant provisions of Section 820 of the Massachusetts Highway Department Standard Specifications for Highway and Bridges, and the following:

The work under this Item shall conform to the relevant provisions of Section 820 of the Standard Specifications for Highway and Bridges and shall consist of installing Town furnsihed poles, bracket arms for luminaires located and detailed on the Contract plans, and the following:

This item includes pole and arm assemblies to be used with the Highway Lighting Luminaire specified under ITEM 823.101A. All poles, arms and luminaires be of the same design shape, dimensionally and aesthetically as detailed in the Contract Plans. All poles shall be in accordance with MassDOT manufacturing and submittal standards.

Pole is a replica of the existing historic "50 50" poles located throughout the Emerald Necklace that were originally made by Mechanics Foundry in Roxbury in the 1940's. Exact attention to the aesthetic details of the pole is required.

"50 50" Bostonian Style Decorative pole and base shall be manufactured by Alloy Castings Co. Inc of East Bridgewater, MA or equal and approved by the Town of Brookline.

Cast Bracket arm shall be manufactured by Spring City, King Luminaire, Alloy Castings or equivalent.

Submittals (Done by others)

MATERIALS

All materials and construction procedures shall conform to the MassDOT standard specifications and to the requirements and standard practices of the Brookline Public Works Department.

The Brookline Public Works Department shall supply the lamp post, arm assembly, and base section as shown in the drawngs and town supplied shop drawings. The Contractor shall supply securing nuts and washers to the subbase, fusing, all necessary wiring and connections to make the unit fully operational, and touch up paint. The Contractor shall be responsible for coordinating the acquisition of the equipment. The Contractor shall pick up posts and base sections from 25 Newton Street, Brookline in lots of no less than twenty (20) units at a time. The Contractor shall notify the Brookline Public Works Department no less than 48 hours in advance prior to the pickup of the equipment. The contact person shall be Mr. Feargal O'Regan at 617-799-9487. The Contractor shall supply a vehicle capable of taking the allocated number of units at one time. The Contractor shall inspect the equipment at time of delivery for damaged units and will acknowledge delivery on a Town supplied receiving notice.

Installation

The Drawings show, in general the location of the roadway lighting systems. They are diagrammatic only, but shall be followed as closely as actual conditions as the site will permit.
All lighting standards shall be set plumb, with vertical place of arms perpendicular to the roadway centerline. The factory furnished protective wrapping shall not be removed until the Engineer so requires.

Poles shall be erected and secured to concrete structure and at grade foundations in a manner as described herein.

A 6- inch galvanized threated stud shall be screwed into the other end of the coupling engaging half of the coupling threads. The bolt shall be rigidly placed into the foundation form using a bolt circle template so that the top of the coupling becomes level with the top of the concrete after pouring and setting. A galvanized leveling nut shall be placed on the stud as close to the concrete as practicable. A galvanized flat washer shall be placed over the leveling nut.
The pole shall be erected with the shoe base placed over the flat washers. Galvanized lock washers shall be placed over the shoe base. Top nuts shall be placed over the lock washers and hand tightened.

Lateral support shall be provided as required. Top and leveling nuts shall be adjusted until pole is plumb. Top nuts shall be tightened to manufacturers recommended torque. Anchor bolt covers or base covers shall be installed on the shoe base with stainless steel screws.
Cable shall be installed through the pole with adequate slack to connect to the luminaire terminals. Adequate slack cable shall be left at the base of the pole to permit connections to the roadway lighting circuits. Install fuse and fuse holder at base to make ready the pole for erection and connection to the roadway lighting circuits.

After erection, all unpainted parts, accessories or hardware shall be field painted the same color as the poles. Galvanized and stainless steel parts shall be properly prepared and primed before final painting.

METHOD OF MEASUREMENT

Measurement shall be made per each unit complete-in-place, tested, and accepted by the Engineer.

BASIS OF PAYMENT

Payment shall be at the contract unit bid price for EACH unit, complete-in-place, which price shall include all labor, loading, transporting, tools, equipment, light pole installation, arm assembly, anchor bolts, washers and securing nuts, materials, including pole wiring, fuses, street light fuse connector, vibration damper, mounting hardware including banner arms, and connections, and all incidentals to complete this item as required.

ITEM 823.101A ORNAMENTAL LED ROADWAY LIGHTING LUMINAIRE EACH – 9500 LUMEN 13500 LUMEN INSTALLATION

GENERAL

All work performed under this Item shall be in accordance with the relevant provisions of Section 820 of the Massachusetts Highway Department Standard Specifications for Highway and Bridges, and the following:

The work under these items shall consist of installation of Town provided luminaire mounted at the locations as shown on the plans or as directed, complete in place.

Submittals (done by Town of Brookline)

MATERIALS

The Brookline Public Works Department shall supply the luminaire for contractor installation. The Contractor shall supply photocell (when specified) and all necessary wiring and connections to make the unit fully operational. The Contractor shall be responsible for coordinating the acquisition of the equipment. The Contractor shall pick up the fixtures from the Brookline Public Works Department at 870 Hammond Street, Brookline, in lots of no less than twenty (20) units at a time. The Contractor shall notify the Brookline Public Works Department no less than 48 hours in advance prior to the pickup of equipment. The contact person shall be Mr. Feargal O'Regan at 617-799-9487. The Contractor shall supply a vehicle capable of taking the allocated number of units at one time.

The Contractor shall inspect the equipment at time of delivery for damaged units and will acknowledge delivery on a Town supplied receiving notice

The luminaire shall be a decorative style pendant mounted type as detailed on the contract documents and be designed for secure mounting and wiring to the specified light pole. The luminaire shall be King Luminaire model K808-P4SH-III-(150 or 100)(SSL)-8084-BK with 5 pin NEMA photocell receptacle and shorting cap, Spring City Electrical Mfg. Co "Ivy" series or approved equal. The luminaire manufacturer shall have been in the business of manufacturing LED lighting products for a minimum of 5 years.

The tested 13,500 lumen luminaire shall deliver a minimum of 13,400 lumens (nominal) with a minimum efficacy of 90. lumens/watt with an 78% : 22% (+/- 2%) downward street side to house side ratio with no more than 2% uplight.. The IES classification shall be Type III-Medium with a Backlight – Uplight – Glare rating not to exceed B3-U3-G3.

The tested 9,500 lumen luminaire shall deliver a minimum of 9,400 lumens (nominal) with a minimum efficacy of 90 lumens/watt with an 80% : 20% downward street side to house side ratio with no more than 2% uplight.. The IES classification shall be Type III-Medium with a Backlight – Uplight – Glare rating not to exceed B2-U3-G2. With no more than 2% uplight.

This item includes luminaires mounted on poles specified on the plans. All luminaires specified in this section shall be delivered and clearly marked with the manufacturer's name and catalog number, voltage, light source maximum wattage and driver be of the same design shape: dimensionally, esthetically and supplied by the same manufacturer. All luminaires specified in this section shall be delivered and clearly marked with the manufacturer's name and catalog number, voltage, lam type, maximum wattage and drive current.

Construction - The design shape of the standard roadway luminaire shall be defined below. Each luminaire shall consist of a cast aluminum upper housing designed for driver storage, accessible without the use of tools and a heavy spun lower housing designed to support the LED light engine assembly. The upper and lower housings shall be joined by a venting chamber to ensure proper heat dissipation management. The luminaire shall be capable of operating voltages ranging from 120-277V. In addition the luminaire shall meet the following requirements:

- Fully assembled and individually electrically tested prior to shipment
- Designed to operate in continuous 50 degree C ambient with degradation of components.
- Designed to meet standard UL1598 requirements for operation in wet locations
- Include passive cooling discipline for thermal management without fans or moving parts
- Designed to provide a minimum average of 60,000 hours of operation without maintenance or replacement of any internal components
- Tested per IESNA LM63 and LM79
- LM-79-08 tested by an independent, UL and NVLAP accredited and certified facilities
- Manufactured in an ISO9001 certified facility

Housing – The housing shall consist of an upper and lower enclosure, connected by a venting spacer for dynamic air flow. The upper housing consists of two aluminum casting designed for mounting the luminaire to the arm hanger component and to facilitate tool-less access to the driver component. The lower housing consists of a heavy spun aluminum enclosure designed to support the LED light engine.

Electrical System - The solid state driver for the LED light source shall be a Class 2 type, operating at a maximum current of 500 mA. The driver shall have a minimum life expectancy of 100,000 hours at or below 25 degrees C, with an operating temperature range from a minimum of -30 degrees C to a maximum of 70 degrees C. The driver casing shall have a minimum ingress protection of IP67.

Optical System – The luminaire shall use high output, high brightness LED's. The LED's shall be mounted on printed aluminum circuit boards with a thermal interface material to maximize heat transfer to the heat sink surface. The LED's shall work with and micro-lens system, capable of producing an IESNA Type III roadway distribution. The LED life rating data shall be determined in accordance with Illuminating Engineering Society of North America (IESNA) Lumen maintenance (LM)-80-08. The LED light engine shall produce a 4000K (+/- 250 degrees) color temperature with a minimum CRI of 70. The lens assembly shall be cast borosilicate glass, chemically etched to diffuse the view of the LED emitters.

Surge Protector – LED driver 3 poles surge protectors that protect Line Ground, Line Neutral and Neutral Ground in accordance with IEEE/ANSI C62.41.2 guidelines,

Finish – The luminaire shall be finished with a TGIC polyester powder coating with smooth texture. The coating system and color shall be the same as specified for Items 821.111 and 821.121. Color shall be gloss black. Color chips shall be submitted for architect's approval.

Warranty – The manufacturer shall repair or replace at no cost any failed LED light engines, drivers, surge modules or any mechanical component defects for a minimum of seven years from date of installation.

Photocell Receptacle – Luminaire shall have an ANSI C136.41-2013 Dimming Receptacle. Receptacle shall be 5 position: 3 power contacts + 2 dimming/signal contacts. Receptacle shall be factory wired to dimming driver. Receptacle shall have a shorting cap installed.

Installation

The luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

All wiring shall be complete and shall be only require attachment of the power supply leads. All power supply leads shall be clearly by means of a permanently attached metal tag. A color lead for bonding the luminaire shall be furnished with each unit in addition to power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under NO CONDITIONS shall wire nuts or non-compression type connectors be allowed.

Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector, with appropriate fuse in the power lead with ampere rating as per luminaire manufacturer's recommendation. Luminaire pole installations shall be fused in the pole handhole.

All cables shall be identified with the appropriate colored marking tape. Neutral and Bonding leads shall be connected using insulated pressure connectors. Power leads for the handhole to the luminaire shall be rated for 600 volts only.

Upon completion of the installation, an operating test shall be conducted to demonstrate that the roadway lighting system and associated equipment operate in accordance with the requirements of this section.

The Contractor shall measure horizontal foot-candles on roadways and at other locations designated by the Engineer. Sufficient measurements shall be made to assure that the distribution characteristics of the luminaire conform to the accepted luminaire photometric data. The photometer used for he measurements shall measure illumination from 0.1 to 20.0 footcandles. Instrument shall be calibrated by an excepted laboratory within 30 days of the test. Roadway illumination tests shall be performed in accordance with IES LM50.

Prior to acceptance, the Contractor shall conduct a performance test involving operating the roadway lighting system, sunrise to sunset, for ten (10) consecutive days without interruption or failure. If a lamp or driver fails, it shall be immediately replaced. This shall not require a restart

of the test. The Contractor shall record each fault, the method and date of correction of each, and the beginning and end of the ten (10) day test.

If the performance test is conducted prior to all other tests, the Contractor shall energize and manually operate the entire lighting system, including control equipment for a minimum period of one hour to ensure that all connections were restored after testing.

The Contractor shall arrange to supply the electric power required to conduct the performance test if the permanent power is not available.

The luminaire shall be aimed so that the "street side" is toward the centerline of the adjacent roadway.

METHOD OF MEASUREMENT

Measurement shall be made per each unit complete-in-place, tested and accepted by the Engineer.

BASIS OF PAYMENT

Payment shall be at the contract unit bid price for EACH unit, complete-in-place, which price shall include all labor, tools, equipment, materials, drivers, wiring, connections, testing and all incidental expenses required to complete these items as required.

A photocell is required for the luminaire nearest each load center, and wired back to the load center. The cost of the photocell shall be considered incidental to the cost of the load center but included with the luminaire.

The roadway lighting LED luminaire will be measured and paid for at the Contract unit price per each installation including hardware and other incidental materials required to complete the installation.

ITEM 823.601A HIGHWAY LIGHTING LOAD CENTER INSTALLATION LUMP SUM

GENERAL

The work to be done under this item shall consist of installing a town Furnished Highway Lighting Load Center (HLLC) of the type specified herein, and as detailed on the drawings including foundation, service connection and necessary conduit. HLLC shall be provided at the locations shown on the plans or as directed by the Engineer. The work done by the contractor will include suppling and installing all electrical equipment, wiring, conduit and trenching (including rail crossings), foundation, service connection and necessary conduit, raceways, within the enclosure as specified herein and shown on the contract drawings. The Contractor shall coordinate, furnish and intstall the conduit and electrical connection with the Town of Brookline and the Electric Utility.

In certain areas as indicated on the contract drawings, a cabinet with an empty backboard shall be provided with a conduit to Electric Utility Manhole or Riser Pole. Contractor shall coordinate with the electric Utility for the Breaking of the Manhole and extension of conduit into the manhole for these and all other HLLCs. Pull ropes shall be provided in empty conduits. The Contractor shall provide utility pole riser for areas that have aerial distribution.

Submittals (done by Town of Brookline)

Submittals for the Highway Lighting Load Center shall be made in a timely fashion including all manufactures data sheets, and shop drawings, as applicable, and specified herein.

Manufacture's Data shall be submitted for the following:

Highway Lighting Load Center Enclosure
Meter Socket
Conduit
Wire
Wire Trough
Circuit Breakers
Lighting Contactor
Fuse Block
Cabinet Luminaire
Receptacles
Switches
Panelboard Enclosure
Main Fused Disconnect
Photocells

Shop drawings shall be submitted for the following:

Highway Lighting Load Center to include enclosure, layout drawing showing the placement of all electrical components within the enclosure, wiring diagrams, and cabinet mounting detail.

Panelboard assembly showing all components with a description of each component.

MATERIALS

The Brookline Public Works Department shall supply the lighting load center cabinet for contractor installation. The Contractor shall be responsible for coordinating the acquisition of the equipment. The Contractor shall pick up cabinet from the Brookline Public Works Department at 870 Hammond Street, Brookline. The Contractor shall notify the Brookline Public Works Department no less than 48 hours in advance prior to the pickup of equipment. The contact person shall be Mr. Feargal O'Regan at 617-799-9487.

Basis of Design: Massachusetts Electrical Apparatus for the load center cabinet and Delta Magnetics for the interior build-out (components).

The Highway Lighting Load Center shall be of the dimensions specified on the contract drawings. The electrical service and system design is for 120/240 volts, single phase, three-wire. All equipment shall be accessible from the front of the enclosure.

The electrical equipment to be provided in the cabinet shall be U.L. listed for its intended use. All electrical equipment shall be installed in compliance with the Massachusetts Electric Code, National Electric Code, and the Electric Utility Company standards. The contractor shall submit shop drawings for Highway Lighting Load Center. The contractor shall verify that all equipment can be mounted in each cabinet prior to the construction of Highway Lighting Load Center enclosure. All electrical equipment and enclosures shall be bonded in accordance with the code.

Service Connection Conduit, utility pole riser (if applicable), materials and methods shall be approved by the Electric Utility Company. Conduit shall extend from the HLLC to the edge of the Electric Utility Company's manhole in areas that the distribution system is underground. The contractor shall coordinate with the Town of Brookline and the Electric Utility Company for electric service connection. The Electric Service Company will break into the manhole and extend the electric service conduit into the manhole. The Contractor shall provide pole riser for electric service connection in areas were the Electric Utility Company's distribution system is aerial.

Enclosure Construction:

The details of the Aluminum Street Lighting Control Cabinets are shown on the Contract Drawings.

The Street Lighting Controller shall consist of a two piece cabinet with a separate fabricated aluminum base and separate fabricated aluminum cabinet. It shall be equipped with a full-size door of one piece construction of aluminum without any small doors or openings. The door shall be recessed to be flush with the front of the cabinet. The cabinet shall be designed so the leaves of the hinges are not exposed. The door shall be attached to the body of the enclosure by means of a continuous ¾" stainless steel piano-type hinge on the right side. The hinge is bolted to the door and to the cabinet with ¼-20 stainless steel carriage bolts and Nylok nuts with a ¼" stainless steel hinge pin welded top and bottom to prevent tampering. The door on the enclosure shall be constructed from the same material as the enclosure. The door shall have a stiffener welded to the inside to prevent vandalism. The door shall be provided with louvers in the lower

section and with filter frame and paper filter element on the inside of the enclosure. Door hardware shall consist of three point latching mechanism with nylon rollers at the top and bottom, ¾" stainless steel round bar door handle with provisions for a padlock, latching door restraint bar, and continuous close-celled neoprene gasket. Additional hardware shall include a brass padlock, directory frame and six sets of keys. All padlocks shall be keyed to match the existing Highway Lighting Load Centers in the Town of Brookline.
Each Highway Lighting Load Center shall be labeled as follows:

STREET LIGHTING CONTROL
Town of Brookline
Department of Public Works

CAUTION
HAZARDOUS
VOLTAGE

The label shall be factory stamped into the door of the Highway Lighting Load Center. Text height shall be 1" tall.

It shall be constructed from 5052-H32 sheet aluminum alloy, which shall contain less than two tenths of one percent copper, and shall have a thickness of 1/8". It shall be free of dents, cracks, and other imperfections other than those inherent to this type of control cabinet.

The enclosure shall be vapor degreased with iron phosphate, primed with 1 coat of epoxy primer and finished with 2 coats of exterior paint. (Black or as specified by the Engineer). Paint is to be air dried for 24 hours and then baked at 250 degrees F for 10 minutes. Painted surface should be a smooth, continuous, uniform in appearance. Painted surface shall be free from paint washout, streaks, blisters or flow lines. The Contractor shall submit paint chip for approval of color, texture and gloss of the paint to the Engineer.

The complete controller assembly shall conform to and meet all the current requirements of the National Electrical Manufacturers Association (NEMA) and be tested in accordance with the provisions of the American Society for Testing and Materials (ASTM) or its successor, wherever such standards and tests may apply.

Anchor bolts shall be provided with the enclosure. The entire length of the anchors bolts shall be galvanized steel. Galvanized steel nuts, lock washers, and flat washers shall be provided with the anchors bolts.

Panelboard Enclosure

The panel board enclosure shall house the main disconnect, circuit breakers, contactors, relays, and buss bars and shall be installed on the panel board as indicated on the drawings. The enclosure shall measure 23" high by 24" wide by 7" deep. The enclosure shall be designated with a NEMA 12 rating. The main door shall be secured by means of two latches securing the door tightly to the enclosure, with the door hinged on the right side. The door shall have a handle that will function as the main switch for the control panel.

An auxiliary door shall be provided on the main door for access to the branch lighting circuit breakers. All knockouts, where cables enter or exit the enclosure shall be equipped with weatherproof insulating bushings protecting all external cables and preventing moisture from entering the enclosure. The enclosure shall be equipped with a metal handle mounted on the top of the enclosure that will allow the unit to be more easily removed and/or installed.

The branch circuit breakers shall be rated 50 amperes with a UL listed interrupting rating of 10,000 amperes symmetrical at 240 volts and shall be in accordance with Federal Specification WC-375, Class 4B. The breaker shall be an industrial type surface mounted within the NEMA 12 enclosure. Access to the breakers shall be accomplished through an auxiliary door that shall be part of the main door assembly. This door shall be latched in place and shall satisfy the NEMA 12 rating when properly installed on the door. The breakers shall be flush with the main door and accessible through the auxiliary door. The auxiliary equipment mounted on the board, i.e.; the control circuit, GFCI receptacle, and lamp shall be protected with a circuit breaker rated at 15 amps per pole (2 required).

The meter socket shall be 100 amperes per pole 5 terminal, and shall be compatible with the electrical meter to be installed by the Utility Company.

The main safety switch shall be 100 amperes, 240 volt, 2 pole, 3 wire, solid neutral, as indicated on the details accompanying these specifications.

The contactors (2) shall be an unenclosed, single phase, 2 pole, IEC, open type magnetic contactor, with a rating of 60 amperes, 120 volt, equipped with auxilary contacts (normally open). These contactors shall be mounted within the main enclosure as indicated on the attached drawings.

A duplex convenience GFCI receptacle shall be rated at 15 amperes. The receptacle shall be fused by a 15 amp circuit breaker located adjacent to the 50 amp circuit breaker. The receptacle shall have a weatherproof cover that is normally closed.

A standard single pole, single throw, maintained contact, 15 amp, 125 volt toggle switch shall be provided for the purpose of photocontrol override. The switch shall be located in a separate box adjacent to the duplex receptacle.

An interior light and junction box-NEMA 4 rating with a porcelain light socket and a 60 watt horizontal burning incandescent lamp shall be provided and installed, as directed on the detail sheets. The lamp is to aid reading of the meter by utility personnel.

A standard single pole, single throw, maintained contact, 15 amp, 125 volt toggle switch shall be provided for the light within the enclosure. The switch shall be located with the duplex receptacle in a double gang plastic enclosure.

A relay system is to be installed in the enclosure for both the normal operation of the panel board and to adapt the system during partial power failures. The system shall consist of two (2) timer relays, one unlatched relay and one latched relay. The relays shall be mounted on a din rail and shall be of the plug in type for replacement purposes.

All cable used in the assembly of the panelboard shall be of the size and type as indicated on the detail sheets, and shall conform to the relevant provision of Section 801 of the Standard Specification.

All cables used for the connection to the Eversource Company leads (R,B,W,G), shall trail off the panelboard a length of two 24". It will be the Contractor's responsibility to coordinate the splicing of these cables with the Utility Co.

The street lighting circuits, and the control light circuit, shall be clearly identified and wired directly inside the enclosure, connecting to the appropriate lug(s) or cables.

The Contractor is cautioned that the electrical components must satisfy not only electrical requirements, but dimensional as well. Specified sizes shown on the Contract Drawings are the only ones that are acceptable, to allow installation on the 24 inch x 36 inch backing board and to allow installation and removal through the door opening with all electrical equipment installed. The Contractor is also cautioned that all splicing in the panelboard assembly must conform to the relevant provisions of Section 813 of the Standard Specification, except that the use of wire nuts, or any non-compression type connectors are prohibited.

Concrete Foundation

Materials shall meet the requirements specified in the following Subsections of Division III, Material:

Cement and Cement Concrete Materials	M4
Metals and Related Materials	M8
Gravel	M1.03.0, Type C

Provide concrete foundation and steel reinforcement as indicated on the Contract Drawings.

Photocells

Twist Lock Long Life Photocells shall have a 20 Year Design Life.

Photocell shall be manufactured by:
Ripley Lighting Controls - #6390L-BK,
Acuity Dark to Light - DLL ELITE #DLL 127-2.8-GY-JU,
Sun-Tech - #TRS-2-8190
Or equivalent.

Photocontrol shall be provided with a means to conveniently and permanently record date of installation and date of removal. Photocontrol shall be provided with an internal, 160 joule minimum, metal-oxide varistor (MOV) type surge arrester. Photocontrol shall be provided with a means of sealing according to the requirements of ANSI C136.10, Section 4.3. Photocontrol base gasket shall be fabricated from a neoprene blend. Photocontrol circuit boards shall be constructed of glass epoxy material. Circuit board components shall be protected from the environment with a thin, transparent coating that does not promote heat build-up.

Photocell ratings:
LOAD RATING: LED, minimum 1,000 watts
OPERATION: Delay up to two minutes to prevent false switching due to light from passing vehicles, lightning, etc.
ON/OFF: Turn ON is 1 to 5 footcandles. Turn OFF is 2.5 to 15 footcandles.
CELL: Silicon, epoxy-coated, 1⁄2" diameter.
CONTACTS: Normally closed (the unit fails in the ON position).
POWER CONSUMPTION: Averages under 1 watt.
TEMPERATURE RANGE: -40˚ to +140˚F (-40˚ to +60˚C) .
FAIL MODE: ON.
WARRANTY: 10 year
UL Listed for wet locations.

CONSTRUCTION

All work shall be constructed as shown on the plans or as required by the utility company and directed by the Engineer. The Contractor shall give adequate notice to the utility company for scheduling of work by utility.

The Highway Lighting Load Center shall be installed atop the foundation as noted in this specification and as shown on the Contract Drawings. The cabinet door shall face away from the roadway, or as directed by the Engineer. It shall be determined that no obstruction, including a light post, will interfere with opening, closing, or access to the HLLC.

Each location, as shown on the plans, may be diagrammatic only, and the location should be such as to not interfere with access to private property or to detract from the general appearance of the area. The location shall not also inhibit pedestrian travel of the public way, including minimum barrier free access of 36". The Contractor shall call to the attention of the Engineer a location that may look objectionable before commencing work at the HLLC site.

The electrical equipment to be installed in each HLLC shall be securely fastened to the backboard in a neat and workmanlike manner. Electrical equipment shall be arranged in the HLLC and wired in accordance to the wiring diagrams on the detail sheets, or as specified herein. Each piece of electrical equipment shall be permanently labeled with and equipment tag. The equipment tag shall be engraved, black, melamine plastic laminate with engraved white lettering. The tag shall be fastened to or above each piece of equipment with stainless steel rivets.

The Contractor shall submit for approval a wiring diagram of the controller interior. The Contractor shall install the necessary 3" conduit from the controller to the appropriate Electric Utility Company manhole or utility pole riser connection and coordinate any necessary manhole breaks with the Electric Utility Company. The electrical connection, including any necessary cable, of the controller to the Electric Utility Company power supply shall be done by the Electric Utility Company. This work by the Electric Utility Company will include the manhole break, wiring, necessary splicing at the manhole and all other related items necessary for Electric Utility Company to make the connection.

Within the controller, the Contractor shall bind wire groups together; and all conductors shall be identified.

The Controller shall be grounded to the ground rods by connecting the servit post grounding connector to the 42" length ground wire supplied as part of the controller base installation.

The photoelectric switch (cell) shall be located as indicated on the plans. The cell shall be positioned according to the manufacturer's recommendations and mounted on the nearest light pole.

Concrete foundation shall be provided with the anchor bolts, reinforcing rods, concrete, and conduit sweeps as shown on the Contract Drawings and accordance with the applicable requirements of Section 901 Cement Concrete Masonry and Section 801.62 Foundations.

Surface Restoration

Where HLLC are installed in existing sidewalk, or paved median areas to remain, the work shall include replacement of the gravel base material and the surface pavement to match pre-construction conditions. Where HLLC are installed in sod area (grass, the work shall include reseeding the area around the HLLC. No separate payment will be made for this work, but all costs in connection therewith shall be included in the lump sum price bid.

METHOD OF MEASUREMENT

The work of this section shall be measured by each Highway Lighting Load Center installed by the Contractor in place, fully operational, tested, and approved by the Engineer.

BASIS OF PAYMENT

Payment for Highway Lighting Load Center Installation will be paid at the contract lump sum price, complete, operational, tested, and accepted in place, which price shall include full compensation for all trenching, backfill, surface restoration, all materials, including all electrical components, installing town furnished enclosure, wiring, grounding, servit post ground connector, concrete foundation, anchor bolts, gravel, conduit and trenching (including rail crossings) to the point of service connection, circuit breakers, load center, meter socket, control wiring, wiring to the two pole mounted photocells, two photocells, receptacle, device boxes, wire troughs, contactors, pull wire, fuses/fuse holders, service connection, manhole breaks, pole risers and all equipment, tools, labor and work incidental thereto including all service connection fees charged by the Electric Utility Company.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
DEP 120-153
BWB 15-04
MassDEP File #

eDEP Transaction #

Brookline, MA
City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. From: Brookline
   Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

Peter	Ditto	
a. First Name	b. Last Name	
Town of Brookline		
c. Organization		
333 Washington Street		
d. Mailing Address		
Brookline	MA	02445
e. City/Town	f. State	g. Zip Code

4. Property Owner (if different from applicant):

N/A		
a. First Name	b. Last Name	
c. Organization		
d. Mailing Address		
e. City/Town	f. State	g. Zip Code

5. Project Location:

Pond Ave/River Road	Brookline, MA
a. Street Address	b. City/Town
N/A	N/A
c. Assessors Map/Plat Number	d. Parcel/Lot Number

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

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Brookline, MA
City/Town

Latitude and Longitude, if known: 42d19m54.93s (d. Latitude) 71d06m47.34s (e. Longitude)

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):
N/A
a. County
b. Certificate Number (if registered land)
c. Book
d. Page

7. Dates: 3/11/2015 (a. Date Notice of Intent Filed) 3/17/2015 (b. Date Public Hearing Closed) 4/7/2015 (c. Date of Issuance)

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):
Brookline Emerald Necklace Bike Path
a. Plan Title
Greenman-Pedersen, Inc.
b. Prepared By
Christer Ericsson
c. Signed and Stamped by
3/9/2015
d. Final Revision Date
1"=20'
e. Scale
f. Additional Plan or Document Title
g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☐ Public Water Supply
b. ☐ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☐ Private Water Supply
e. ☐ Fisheries
f. ☐ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☐ Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☒ Bordering Land Subject to Flooding	3,050 a. square feet	3,050 b. square feet	456 c. square feet	456 d. square feet
Cubic Feet Flood Storage	320 e. cubic feet	320 f. cubic feet	456 g. cubic feet	456 h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☒ Riverfront Area	55, 675 a. total sq. feet	55, 675 b. total sq. feet		
Sq ft within 100 ft	54, 899 c. square feet	54, 899 d. square feet	e. square feet	f. square feet

Sq ft between 100-200 ft	776 g. square feet	776 h. square feet	i. square feet	j. square feet

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	c. nourishment cu yd	d. nourishment cu yd
14. ☐ Coastal Dunes	a. square feet	b. square feet	c. nourishment cu yd	d. nourishment cu yd
15. ☐ Coastal Banks	a. linear feet	b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		

B. Findings (cont.)

* **#22.** If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

22. ☐ Restoration/Enhancement *:

N/A
a. square feet of BVW

b. square feet of salt marsh

23. ☐ Stream Crossing(s):

N/A
a. number of new stream crossings

b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. The work is a maintenance dredging project as provided for in the Act; or
   b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
   c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

    "Massachusetts Department of Environmental Protection" [or, "MassDEP"]

    "File Number 120-153 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")
    (1) ☒ is subject to the Massachusetts Stormwater Standards
    (2) ☐ is NOT subject to the Massachusetts Stormwater Standards

    If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

    a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

    b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
    i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
    ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
    iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):
See attached.

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

21. No work within a Resource Area or within 150 feet of a Resource Area, other than that as conditioned herein, shall be permitted without the formal prior written approval of the Conservation Commission.

22. Work shall conform in all respects to plans and supporting data cited herein, unless otherwise conditioned in this Order of Conditions. No other changes shall be made without formal approval from the Conservation Commission. This Order of Conditions does not relieve the Applicant from complying with all other Federal, state and local laws and regulations.

23. The Applicant shall notify the Commission of any change required by other Boards or Commissions. Any change contemplated or required in the approved plans, cited herein, shall be submitted to the Conservation Commission for its review and approval prior to its implementation. If the Conservation Commission deems that a proposed change is major or substantial, a new public hearing may be required, or the Commission may direct the Applicant to file a new Notice of Intent.

24. All correspondence and submissions to the Commission regarding work under this Order shall have the DEP number clearly referenced. Any submissions not referencing these numbers may be deemed unacceptable.

25. Issuance of these conditions does not in any way imply or certify that the site or downstream areas will not be subject to flooding, storm damage, or any other form of damage due to wetness.

26. This Order of Conditions is applicable to any successor in interest or in control.

27. Prior to the commencement of work on site:

    a. or within 30 days of the issuance of this Order of Conditions if construction is not commenced, the Applicant shall record this Order of Conditions at the Norfolk County Registry of Deeds, and shall provide to the Commission an attested copy of this Order of Conditions showing either the instrument number or the Book and Page number evidencing recordation.

    b. evidence that the Department of Conservation and Recreation has reviewed and approved the referenced plans.

    c. the Applicant or his/her agent shall provide to the Commission written notification giving the name, title, address and telephone numbers of the person or persons designated by the petitioner to be in compliance with the conditions of this Order of Conditions on site. An emergency telephone number shall also be provided in the event that action is required during non-working hours. Said notification shall be amended, as appropriate, over the

course of the project, and submitted to the Commission at the time of or prior to any change.

d. the Applicant shall provide to the Conservation Commission copies of all other permits, variances, licenses or determinations which may be issued by other regulatory agencies, such as Special Permits, Site Plan Review permit, U.S. Army Corps of Engineers permit, Massachusetts Waterway License, etc.

e. erosion controls, consistent with Natural Resources Conservation Service Guidelines, shall be installed by hand and maintained so as to prevent sedimentation of Wetland Resource Areas for the duration of the project. The Applicant shall notify the Conservation Commission office when the controls have been installed. Erosion controls must be inspected and approved by the Conservation Administrator.

f. the Project Supervisor in charge of day to day operations on site shall read this Order and sign a copy of each page, indicating that each and every condition has been read and understood. These signed pages shall be submitted to the Conservation Commission.

g. the Applicant shall provide to the Commission written notification of the intent to start work on site. Such notification shall be given not less than two nor more than five business days prior to the intended date of commencement of work. In the event that work ceases on the site for a period of time greater than five business days, this condition shall reapply prior to the recommencing of work at the site.

h. the applicant and the site contractor shall meet with the Conservation Administrator on the project site to review the project and the Order of Conditions.

i. the limits of work shall be clearly marked in the field with surveyors tape, or plastic snow fence. This limit of work is to be maintained at all times during construction activity. No activity is to occur beyond this line without the prior written permission of the Conservation Administrator.

28. The Conservation Commission reserves the right to require additional erosion controls if deemed necessary by the Commission or the Conservation Administrator.

29. The site contractor and Applicant shall be responsible for compliance with these conditions.

30. A copy of this Order of Conditions as well as copies of all plans, reports and supporting documents cited herein shall be available on site at all times while activities regulated by this Order of Conditions are being performed. In addition to the owner, all

contractors and subcontractors shall be held responsible for compliance with this Order of Conditions.

31. The members and the agents of the Conservation Commission shall have the right to enter the site to verify compliance with this Order of Conditions and to require the submittal of additional data deemed necessary by the Commission for that verification. If it is determined that the project is not in compliance with this Order of Conditions, the Commission may require corrective action or may order the petitioner to cease and desist work on site.

32. All cuttings, debris and other disposable materials from the project shall be taken off site for appropriate disposal. No material shall be dumped within the wetlands or within 150 feet of the wetlands. The property owner shall be liable should any materials be dumped in these areas.

33. During and after work on this project, there shall be no discharge or spillage of fuel, oil, or other pollutants onto any part of the site. The owner and contractor shall take all reasonable precautions to prevent the release of pollutants by ignorance, accident, or vandalism.

34. Only clean fill shall be used on site. Clean fill does not include asphalt or any hazardous substance.

35. This Permit is issued under the Wetlands Protection Act, MGL Chapter 131, section 40, and the Brookline Wetlands By-Law and may be deemed invalid by the Commission, if any of the information provided to the Commission during the Public Hearing is erroneous.

36. The Conservation Administrator shall serve as the Conservation Commission's agent in all matters pertaining to the interpretation and the enforcement of the Order of Conditions.

37. Storing, servicing or cleaning of equipment, including but not limited to: fueling, adding, changing or applying lubricants or hydraulic fluids, or washing/rinsing of trucks or equipment shall be performed outside the 150 foot buffer zone.

38. Immediately following contouring and grading, all exposed areas shall be stabilized. Bark mulch shall not be considered an appropriate measure for permanent stabilization of soil upslope of Wetland Resource Areas.

39. The Applicant shall immediately control any erosion problems that occur on site and shall also immediately notify the Commission.

40. Prior to requesting a Certificate of Compliance, the petitioner shall provide to the Commission the following:

a. completed WPA FORM 8A (Request for a Certificate of Compliance).

b. a written request, that a Certificate of Compliance/Final Release be issued, stating that the work has been satisfactorily completed as proposed and conditioned herein. The request shall state compliance with each condition of this Order of Conditions.

c. an as-built plan, based on an in-field survey, showing as-built grades. The plan shall be prepared, signed and stamped by a Massachusetts registered professional engineer or land surveyor and certified by said engineer or surveyor to be in substantial compliance with the plans approved in this Order of Conditions, and setting forth what deviations, if any, exist from the plans approved in this Order of Conditions. This as-built plan shall include all areas and structures within 150 feet of any Wetland Resource Area, as well as all other information shown on the plan approved in this Order of Conditions.

d. color photographs of the site, which shall show all altered areas under the jurisdiction of the Conservation Commission. The photographs shall be labeled, dated and keyed to a copy of the as-built plan for ready identification.

e. any additional information the Commission deems necessary for determining if a Certificate of Compliance/Final Release should be issued.

END

TOWN OF BROOKLINE

MASSACHUSETTS

CONTRACT

CLAUSE 1 - This agreement, made this_____day of _____ in the year two thousand and seven, between the Town of Brookline by its Selectmen, acting on behalf of said Town, and not individually, and without incurring any individual liability thereby, hereinafter called the Town as party of the first part and _____, party of the second part, hereinafter called the Contractor.

CLAUSE 2 - WITNESSETH, That the parties to this agreement, each in consideration of the agreements on the part of the other herein contained, do hereby agree, the Town of Brookline for itself and said Contractor for itself and its successors and assigns, as follows:

The Contractor agrees to furnish all equipment, machinery tools and labor, to furnish and deliver all materials required to be furnished and delivered in and about the improvement and to do and perform all work in **Contract No. PW/15-20 Re Bid "Washington Street / Emerald Necklace Pedestrian & Bicycle Improvements "** in strict conformity with the provisions herein contained and in the Notice to Contractors, Instruction to Bidders, Special Provisions and Additions hereto attached and the "STANDARD SPECIFICATIONS" on file at the office of the Commissioner of Public Works in Brookline and with the plans referred to therein.

The "STANDARD SPECIFICATIONS" herein referred to shall consist of the following documents as modified by the said Instruction to Bidders, including Amendments to Division II (Construction Details), Amendments to Division III (Materials Specifications) and Special Provisions and Supplementary Specifications attached hereto:

1. The 1988 edition of STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES of the Commonwealth of Massachusetts, Department of Public Works and;

2. AMENDMENTS AND SUPPLEMENTAL SPECIFICATIONS to the said STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES in effect on date project was advertised.

All said plans, the said "STANDARD SPECIFICATIONS", the said Instruction to Bidders, Amendments to Division II (Construction Details), Amendments to Division III (Materials Specifications), Proposal, Special Provisions and Supplementary Specifications are hereby specifically made a part of this contract as fully and to the same effect as if the same had been set forth at length herein.

CLAUSE 3 - In consideration of the foregoing premises, the Town agrees to pay and the Contractor agrees to receive as full compensation for all work required but not shown on the plans for the items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements (except as excluded in Subsection 7.18) or

from any delay (see Subsection 8.04) or from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work herein specified, and for well and faithfully completing the work, and the whole thereof, as herein provided, such unit process as are set out in the accompanying Proposal, and for all work required, for which there is no item in the Proposal, such compensation as is provided for in the aforesaid "STANDARD SPECIFICATION".

In witness whereof, the said Contractor has caused these presents to be signed and its corporate seal to be hereto affixed by

_____ its _____

thereto duly authorized, and the said Town executed these presents by its Board of Selectmen, acting for said Town, and not individually, and without incurring and individual liability, on the year and day above written.

Town of Brookline

By _____

_____

_____ Board of Selectmen

_____

_____

By _____ Contractor _____
Seal

_____

_____

Certified in accordance with
Chapter 44, Section 31C and
Approved as to Form: based upon Engineering estimates

_____ _____

Town Counsel Comptroller

PERFORMANCE BOND

Know all persons by these presents, that _____ as principal, and _____ as surety, are held and firmly bound unto the Town of Brookline, Massachusetts in the sum of _____ ($) in lawful money of the United States of America, to be paid to the Town of Brookline, Massachusetts, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas the said principal has made a Contract with the Town of Brookline, acting through its Board of Selectman ("Awarding Authority"), bearing the date of _____ for the construction of Contract No.: PW/15-20 Re Bid Washington Street / Emerald Necklace Pedestrian & Bicycle Improvements.

Now the condition of this obligation is such that if the principal shall well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of said Contract and any extensions thereof that may be granted by the Town of Brookline, with or without notice to the surety, and during the life of any guarantee required under the Contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said Contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise it shall remain in full force and effect.

In the event that the Contract is abandoned by the Contractor, or is terminated by the Town of Brookline under the provisions of said Contract, said surety shall, if requested in writing by the Town of Brookline, take such action as is necessary to complete the Contract.

In witness whereof we hereunto set our hand and seals this _____ day of _____, 20____.

_____ (Seal)
(Print Name of General Contractor)

BY _____
(Signature- Title)

_____ (Seal)
(Print Name of Surety)

BY _____
(Signature- Title)

Surety Address _____
_____

PAYMENT BOND

Know all persons by these presents, that _____ as principal, and _____ as surety, are held and firmly bound unto the Town of Brookline, Massachusetts in the sum of _____ ($) in lawful money of the United States of America, to be paid to the Town of Brookline, Massachusetts, for which payments, well and truly made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas the said principal has made a Contract with the Town of Brookline, acting through its Board of Selectman ("Awarding Authority"), bearing the date of _____ for the construction of Project No.: N/A, Contract No.: PW/15-20 Re Bid Project Name: Washington Street / Emerald Necklace Pedestrian & Bicycle Improvements.

Now the condition of this obligation is such that if the principal shall pay for all labor performed or furnished and for all materials used or employed in said Contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said Contract that may hereafter be made, notice to the surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purpose or items set out in, and to be subject to, provisions of Massachusetts General laws Chapter 30 section 39A, and Chapter 149, section 29, as amended, then this obligation shall become null and void; otherwise it shall remain in full force and effect.

In witness whereof we hereunto set out hand and seals this _____ day of _____, 20___.

_____ (Seal)
(Print Name of General Contract)

BY_____
(Signature- Title)

_____ (Seal)
(Print Name of Surety)

BY _____
(Signature- Title)

Surety Address _____
_____

STATE TAX CERTIFICATE

Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that I, to the best of my knowledge and belief, have filed all state tax returns and paid all state taxes required under law.

Social Security Number* or Federal Identification Number*	Signature of Individual or Corporate Name
	by: _____ Corporate Officer (If applicable)

* Submission of a Social Security Number or a Federal Identification Number is voluntary.